Service Manual

Colour Video Cameras

MODELS **WVP-100E/WVP-100N**

Vol. 1 ***Circuit Descriptions***

Vol. 2 ***Adjustment Procedures***
Trouble Shooting Guides

Vol. 3 ***Block Diagrams***
Schematic Diagrams
Conductor Views

Vol. 4 ***Replacement Parts List***
Exploded Views

National/Panasonic

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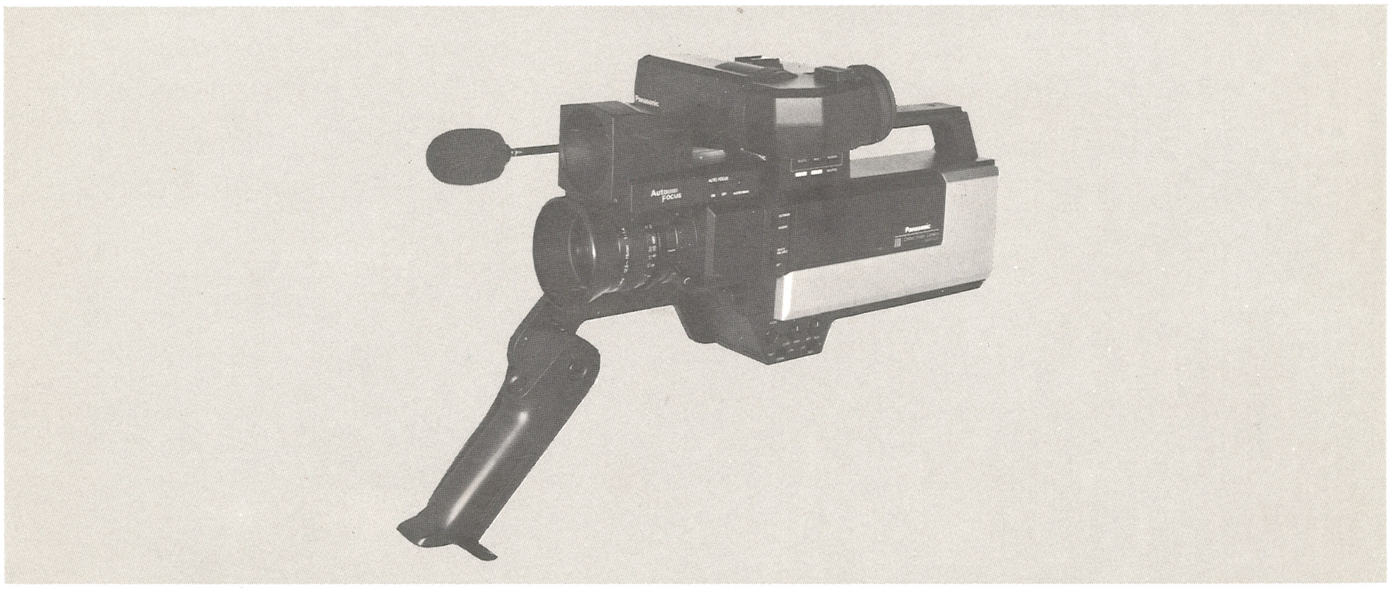
Service Manual

Vol. 1

Circuit Description

Colour Video Cameras

WVP-100E/WVP-100N



1. Principle of Single Carrier Frequency Multiplexing System using a Single tube 1
2. Preamplifier Board (YFVPKA0802EA) 6
3. Deflection Board (YFVPKB1001EA) 8
4. Process Board (YFVPKC1001EA) 19
5. Correction Board (YFVPKA0808JA) 44
6. Micro Processor Board (YFVPKD1001EA) 47
7. Auto Focus Board (YFES950-24A) (YFES950-24B) (YFES950-24C) (YFES950-24D) 65
8. Electronic Viewfinder Board (YFVPKA0803JA) 73
9. Camera Remote Control Unit (Option) (WV-CR10) 75

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P.O. Box 288, Central Osaka Japan

1 Principle of Single Carrier Frequency Multiplexing System using a Single Tube.

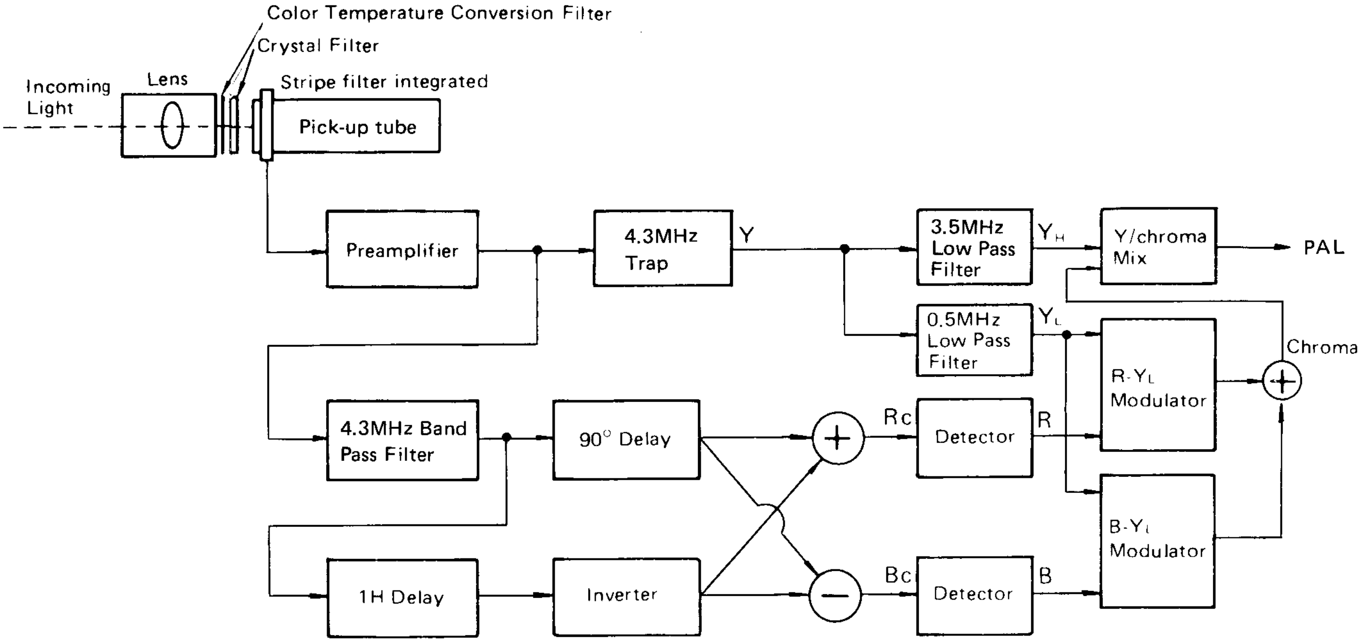

Color Temperature Conversion Filter
Crystal Filter
Stripe filter integrated
Incoming Light
Lens
Pick-up tube
Preamplifier
4.3MHz Trap
Y
3.5MHz Low Pass Filter
Y_H
Y/chroma Mix
PAL
0.5MHz Low Pass Filter
Y_L
Chroma
R-Y_L Modulator
4.3MHz Band Pass Filter
90° Delay
Rc
Detector
R
B-Y_L Modulator
1H Delay
Inverter
Bc
Detector
B

Fig. 1-1 Principle of Single Carrier Frequency Multiplexing System using a Single Tube

The incoming light to the camera which passes through the automatic iris control(AIC) lens, the color temperature conversion filter, and the crystal filter reaches the surface of the integrated stripe filter in a 2/3" pick-up tube (SATICON®) (H4100A).

The diffusion filter is inserted between the AIC lens and the color temperature conversion filter when the white balance switch is set to SET position.

Color Temperature Conversion Filter

Generally, the human eye is sensitive to electromagnetic waves from 380mμ(mμ=nm) to 780mμ in wavelength (the visible region). (Fig. 1-2)

In addition, the human eye also discerns the wavelength difference as a color difference. The human eye responds to the light between 400mμ to 500mμ wavelength as predominantly blue information, the light between 500mμ to 600mμ as green information, and the light between 600mμ to 700 mμ as red information. The entire light in the "visible" range of wavelength from 380mμ to 780mμ is "seen "as different amount of white light.

When a carbon is burned, it emits light of a different quality depending on how hot it is. Various natural light can be expressed in terms of a color temperature which may be referred to a light emitted from the burning carbon used as a standard. A light source of 3200°K (K=Kelvin: -273°C corresponds to 0°K an absolute temperature) color temperature, which is used in studios, implies that its quality (color) is the same as that emitted from the carbon burning at 3200°K (2927°C).

The relationship between the color temperature of light sources used for illumination and weather conditions are shown in Fig. 1-4. The color temperature goes up as the weather turns overcast from clear. This may be related to the burning carbon(charcoal) as follows. When the charcoal is heated and begins to glow (at low temperature), it emits a reddish light. But when it is so-called white hot (at high temperature), a bluish light is emitted. In other words, the light at a low color temperature is considered reddish and at high color temperature is considered bluish.

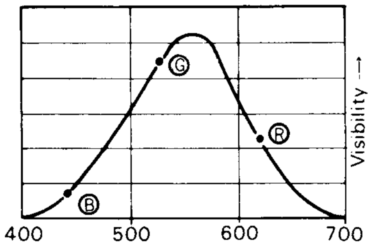


Fig. 1-2 Standard Luminosity Curve

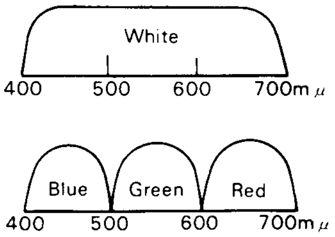

White
400
500
600
700mμ
Blue
Green
Red
400
500
600
700mμ

Fig. 1-3 The Visible Spectrum

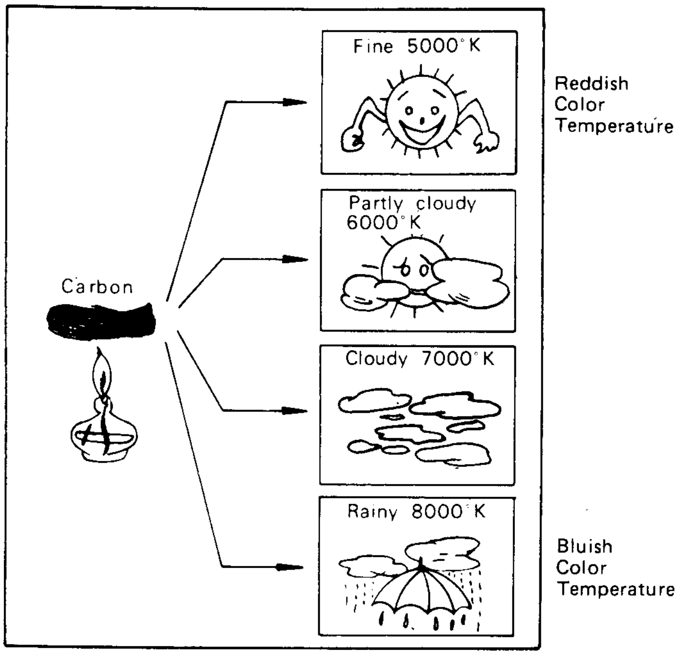


Fig. 1-4 Color Temperature and Weather Conditions

When a color camera is pointed at an object illuminated by a light of low color temperature, it reproduces a reddish picture. When a color camera is pointed at an object illuminated by a light of high color temperature, it reproduces a bluish picture.

The color camera has the indoor-outdoor selection switch which corrects for the color temperature of the light. When the switch is set to the outdoor position, the 5500°K COLOR TEMPERATURE CONVERSION FILTER is inserted into the light path to convert the color temperature from 5500°K to 3200°K.

In addition to the indoor-outdoor selection switch utilizing the color temperature conversion filter, this camera is designed so that the level of red and blue signals can be changed independently to meet the color temperature of the light source in order to ensure proper color reproduction.

Crystal Filter

As described later, since the red and blue images are modulated by the fine stripe filter built into the pick-up tube, false signals could develop due to interference between the stripe filters and fine detail objects. The crystal filter is an optical low pass filter which prevents the occurrence of such false signals by blocking the high frequency components of images.

Diffusion Filter

When the white balance switch is set to SET position, the diffusion filter is inserted between the lens and the color temperature conversion filter to diffuse the incoming light, and the whitish light reaches the pick-up tube.

Pick-up Tube

Different from that of the black and white camera, the pick-up tube used in this color camera has a built-in stripe filter, a metallic stripe called the optical black(OB) located on the face-plate. The video signals black level is set in reference to the signal from the optical black.

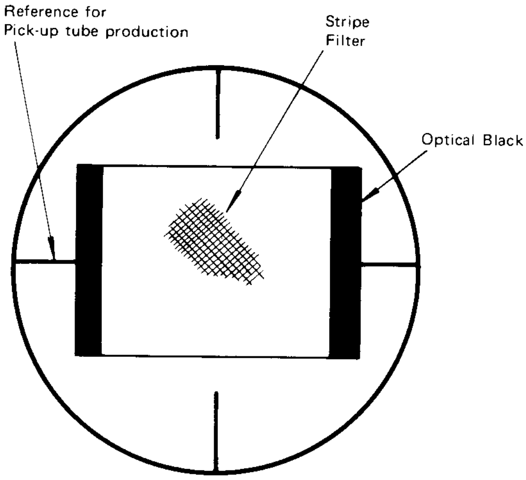


Fig. 1-5 Front View of Pick-up Tube

As shown in Fig.1-8 Ⓑ , the stripe filter integrated into the pick-up tube consists of a cyan/transparent stripe filter section and a yellow/transparent stripe filter section. These stripe filters are so arranged as to be of the same pitch in the horizontal scanning direction, and have equal angles with respect to the vertical. The pick-up tubes even and odd scanning lines pass the tracks of the stripe filters that are arranged in the same way. In other words, the even and odd scanning lines are spaced "a" part.

For easy understanding, let's assume that light of uniform level containing green(G), red(R), and blue(B) reaches the pick-up tube(Fig. 1-8 Ⓐ), and that the crosspoint of cyan and yellow stripe filter is scanned as shown in Fig. 1-8 Ⓑ .

Let's consider the light output from the stripe filter. The cyan filter cuts off the red(R) light which is complementary to it, and the yellow filter cuts off the blue(B) light which is complementary to it. (Fig. 1-6).

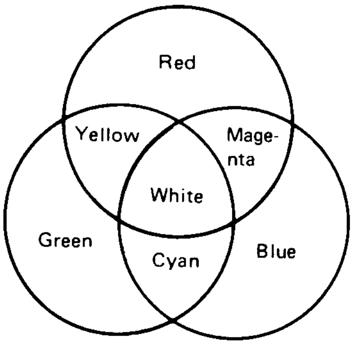


Fig. 1-6 Complementary Color

The light output Ⓒ, which corresponds to the Nth scanning line contains the modulated R and B components, riding on top of unmodulated G component. The light output Ⓓ, which corresponds to the N+1st scanning line contains the modulated R and B components, riding on top of the unmodulated G components. Light output Ⓔ, Ⓕ, and Ⓖ correspond to N+2nd, N+3rd and N+4th scanning lines respectively. The light Ⓒ for the Nth line and the light Ⓖ for the N+4th line are exactly same.

The stripe filters have the same pitch in the horizontal scanning direction, and the same angle in the vertical directions so that there is a phase difference of 90° among modulated components.

The pick-up tube produces the video signal whose waveform is the same as the that of the light which comes from the stripe filter.

The modulation frequency for the R and B signals can be calculated from the following equation.

$$f = \frac{w \times 10^3}{p \times t} \quad (\text{MHz})$$

Here, f : Modulation frequency (MHz)
W : Horizontal width of effective scanning area of pick-up tube (mm)
p : Stripe filter pitch (μm)
t : Horizontal video signal duration (line duration (1H)−horizontal blanking duration (H.BL)) (μs)

Specially;
$W = 8.00\text{mm}$
$p = 35.8\ \mu\text{m}$
$t = 1\text{H} - \text{H.BL} = 64 - 12.03 = 51.97\mu\text{s}$

$$f = \frac{w \times 10^3}{p \times t} = \frac{8.00 \times 10^3}{35.8 \times 51.97} = 4.3\ \text{MHz}$$

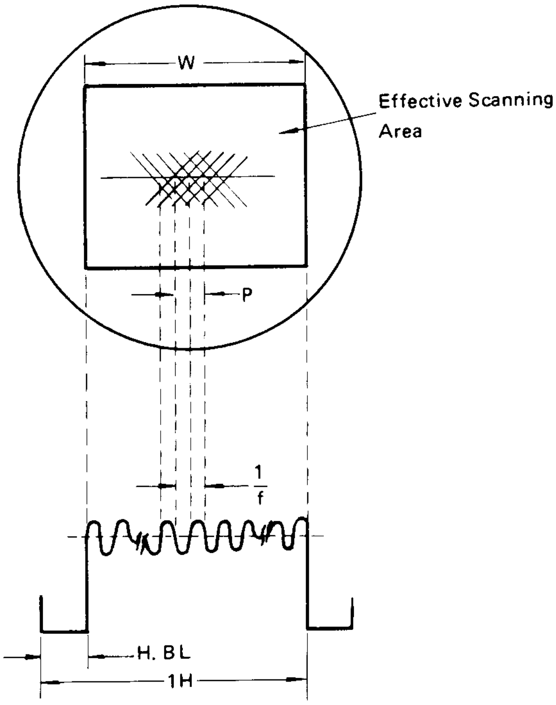


Fig. 1-7 Modulation Frequency

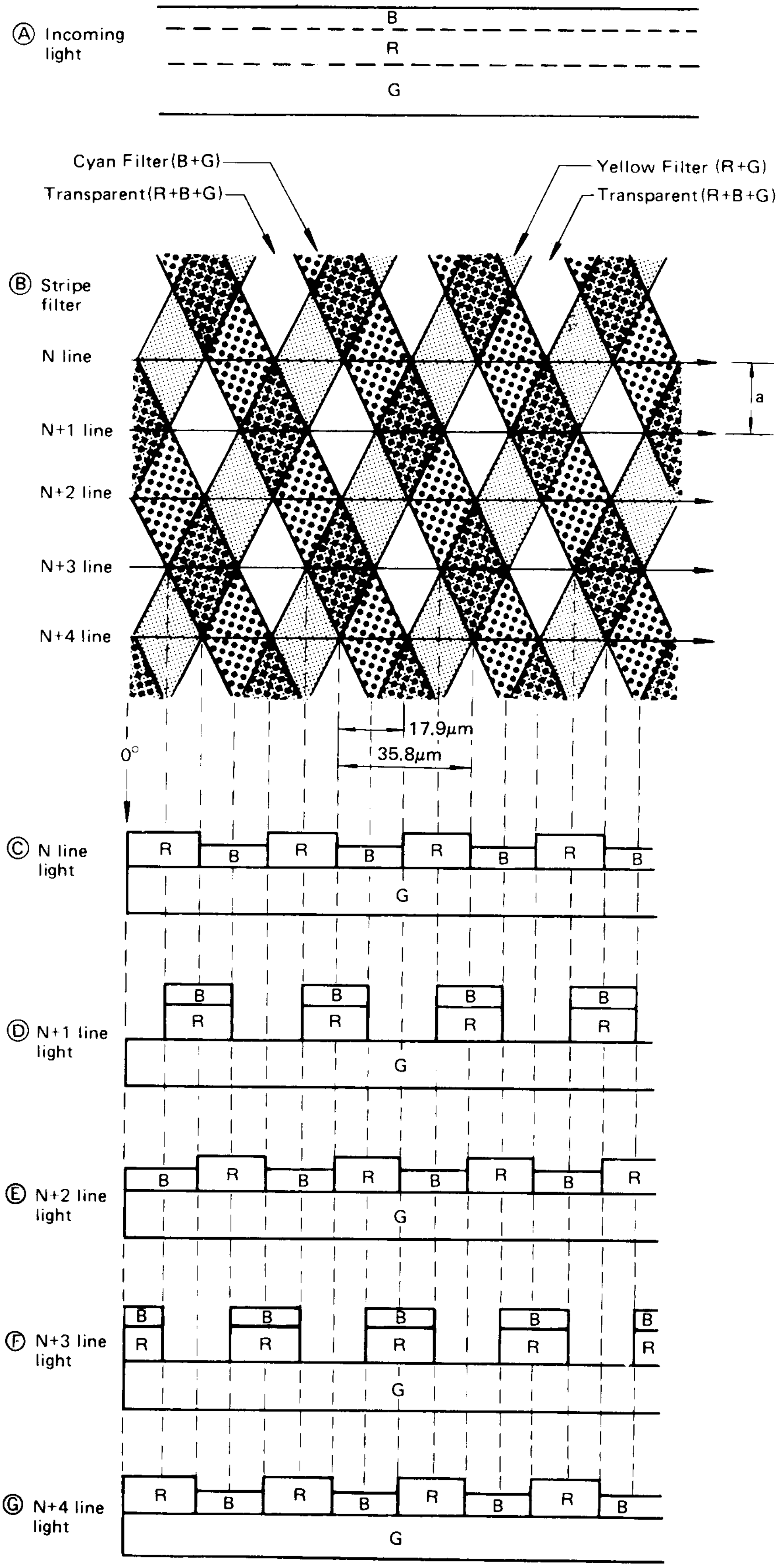

Ⓐ Incoming light
B
R
G
Cyan Filter(B+G)
Transparent(R+B+G)
Yellow Filter (R+G)
Transparent(R+B+G)
Ⓑ Stripe filter
N line
N+1 line
N+2 line
N+3 line
N+4 line
a
17.9μm
35.8μm
0°
Ⓒ N line light
R
B
G
Ⓓ N+1 line light
B
R
G
Ⓔ N+2 line light
B
R
G
Ⓕ N+3 line light
B
R
G
Ⓖ N+4 line light
R
B
G

Fig. 1-8 Light from Stripe Filter

The incoming light is thus converted by the integrated stripe filter into a signal which contains R and B signals modulated by 4.3MHz, and the G signal.

This signal is sent to the preamplifier, where it is amplified. The amplified signal Ⓗ (see Fig. 1-10) from preamplifier is sent to the 4.3MHz trap circuit, which passes only the luminance(Y) signal Ⓘ comprising the G signal and the mean value of the modulated R and B signals. The mean value of modulated R and B signals on adjacent scanning lines are equal so that the luminance signal corresponding to two successive lines is also equal (see Fig. 1-9) due to the characteristics of the trap circuit.

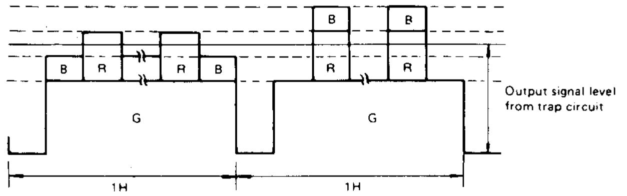

B
R
B
R
R
B
B
B
G
G
Output signal level from trap circuit
1H
1H

Fig. 1-9 Detection of Y signal

The Y signal thus obtained is supplied to the 3.5MHz low pass filter and the 0.5MHz low pass filter. The luminance(YH) signal having high frequency response and the luminance signal (YL) having low frequency response come out from these low pass filters.

The YH signal is supplied to the Y/chroma mix circuit and the YL signal to the R-YL and B-YL modulator circuits.

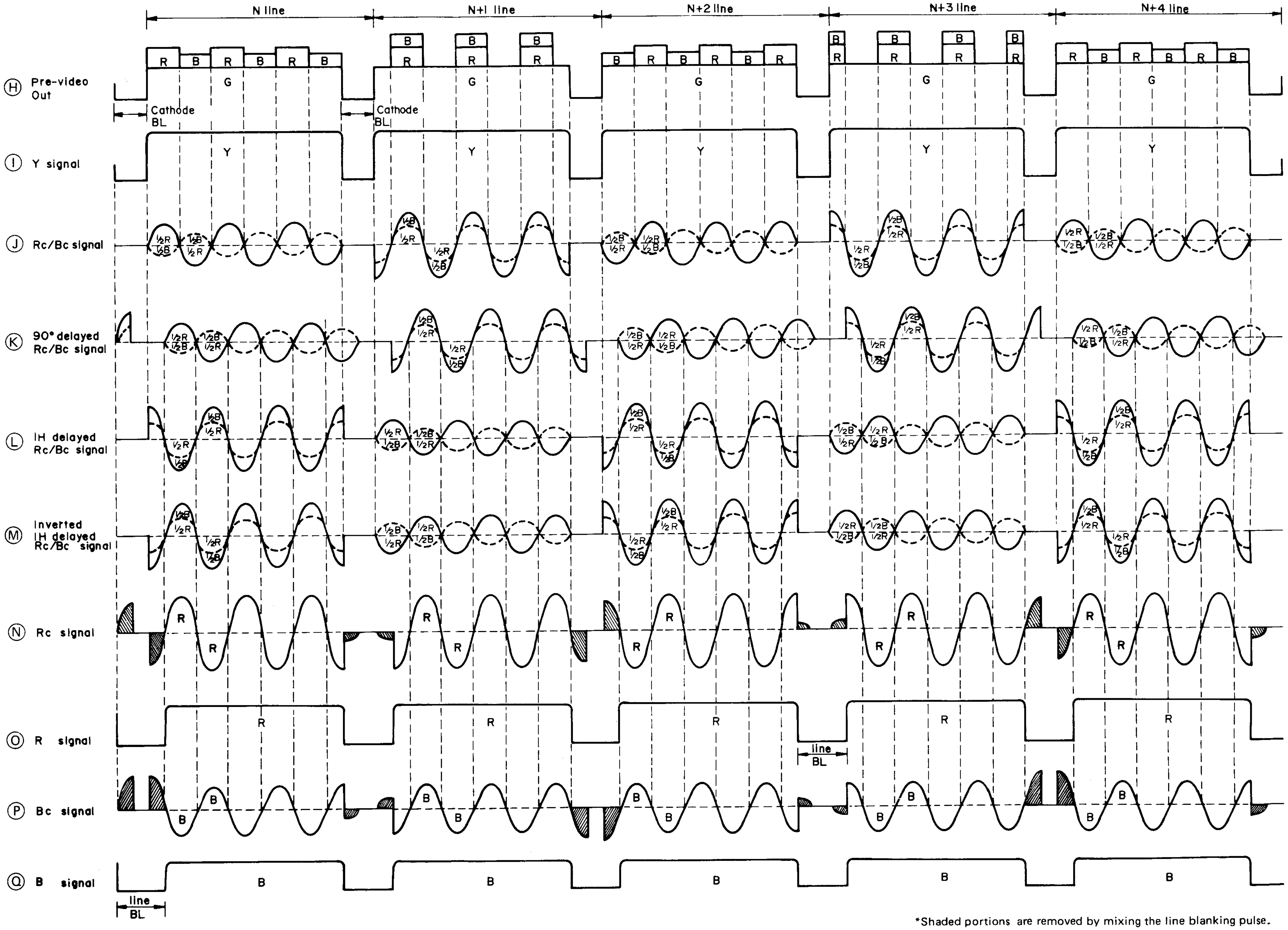
The amplified signal Ⓗ is also supplied to the band-pass-filter (B.P.F.) whose center frequency is 4.3MHz and through which only the 4.3MHz modulated signal Ⓙ passes.

The modulated signal Ⓙ is sent to the 90° phase shift circuit and the 1H(1 line) delay circuit, from which 90° phase shifted and 1H delayed modulated signals Ⓚ and Ⓛ are obtained.

The 1H-delayed modulated signal Ⓛ is inverted and the signal Ⓜ is obtained. The modulated R(Rc) signal Ⓝ is obtained by adding the modulated signals Ⓚ and Ⓜ, and the modulated B(Bc) signal Ⓟ is obtained by subtraction of the modulated signals Ⓚ and Ⓜ. The shaded portions on the signals Ⓝ and Ⓟ are removed by mixing the line blanking pulse.

The Rc and Bc signals obtained by addition and subtraction are supplied to detectors, from which R signal Ⓞ and B signal Ⓠ are obtained. The R signal and B signal thus obtained are fed to the R-YL and B-YL modulator circuits respectively.

The chrominance signal obtained by mixing the R-YL and B-YL modulated signals is supplied to the Y/chroma mix circuit where it is mixed with the luminance(YH) signal to result in a PAL signal.


N line
N+1 line
N+2 line
N+3 line
N+4 line
Ⓗ Pre-video Out
Cathode BL
Ⓘ Y signal
Ⓙ Rc/Bc signal
Ⓚ 90° delayed Rc/Bc signal
Ⓛ 1H delayed Rc/Bc signal
Ⓜ Inverted 1H delayed Rc/Bc signal
Ⓝ Rc signal
Ⓞ R signal
Ⓟ Bc signal
Ⓠ B signal
line BL
R
B
G
Y
½R
½B

*Shaded portions are removed by mixing the line blanking pulse.

Fig. 1-10 Detection of Y, R and B Signals

2 Preamplifier Board (YFVPKA0802EA)

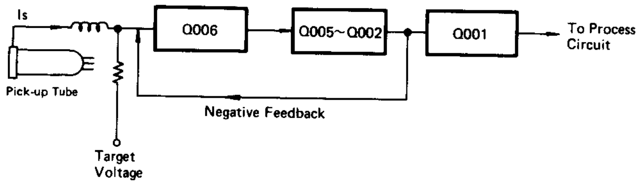
Outline

This circuit amplifies the signal current Is (0.2μA~0.3μA) from the pick-up tube.

The amplified video signal is delivered to the AGC & tracking signal generator circuit on the Process board.

The preamplifier is a low output impedance and negative feedback amplifier which uses a low noise FET at the input.

To maintain the low noise in the signal, a so-called Percival circuit is used. It improves the S/N ratio at relatively high frequencies (where color components are located).



Is
Pick-up Tube
Target Voltage
Q006
Q005~Q002
Q001
To Process Circuit
Negative Feedback

Fig. 2-1 Preamplifier

Details

The signal current from the pick-up tube, comprising the modulated red(R) and blue(B) components, and the green(G) component, is supplied to the target terminal of the Preamplifier circuit and converted to the video signal by R017 through L002 Percival coil. This video signal is amplified approx. 30dB by the amplifier which consists of Q006 FET and Q005. The amplified signal is then fed to Q004, Q003 and Q002 which amplify the input signal approx. 66dB.

The signal at the collector of Q002 is negatively fed back to the gate of Q006 through a feedback circuit which consists of R014, R015, C006 and C007.

The CT001 adjusts the frequency response of the feedback signal and corrects the frequency response of video signal.

The video signal whose frequency response is shaped by the negative feedback is converted to the low impedance video signal with the use of buffer Q001. It is then supplied to the Process board (YFVPKC1001EA).

The target voltage for the pick-up tube is supplied from the Deflection board to terminal No. 3 (Target voltage in) of the multi-pin connector CN002 through the Process board.

The target voltage, is supplied to the pick-up tube target through R001, R018 and L002.

Percival Circuit

The pick-up tube's output is a low noise signal, so that the video S/N is determined by the noise of the pre-amplifier.

The S/N of the modulated R and B signal is lower than the S/N of the non-modulated signal in the low frequency range due to effects of the pick-up tube output capacitance and the input capacitance of the pre-amplifier.

Percival circuit is adopted to reduce the effects of these capaicitances and improve the S/N.

The beneficial effects of the Percival circuit are shown in Fig. 2-2. The equivalent circuit is also shown in Fig. 2-3.

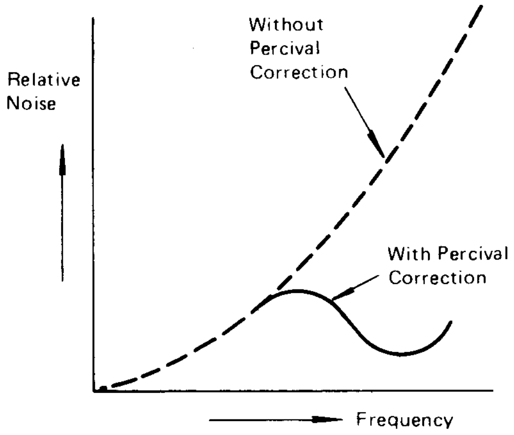
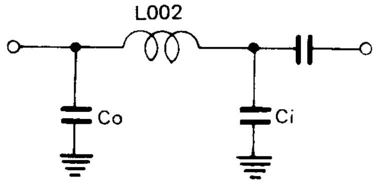


Fig. 2-2 Percival Correction

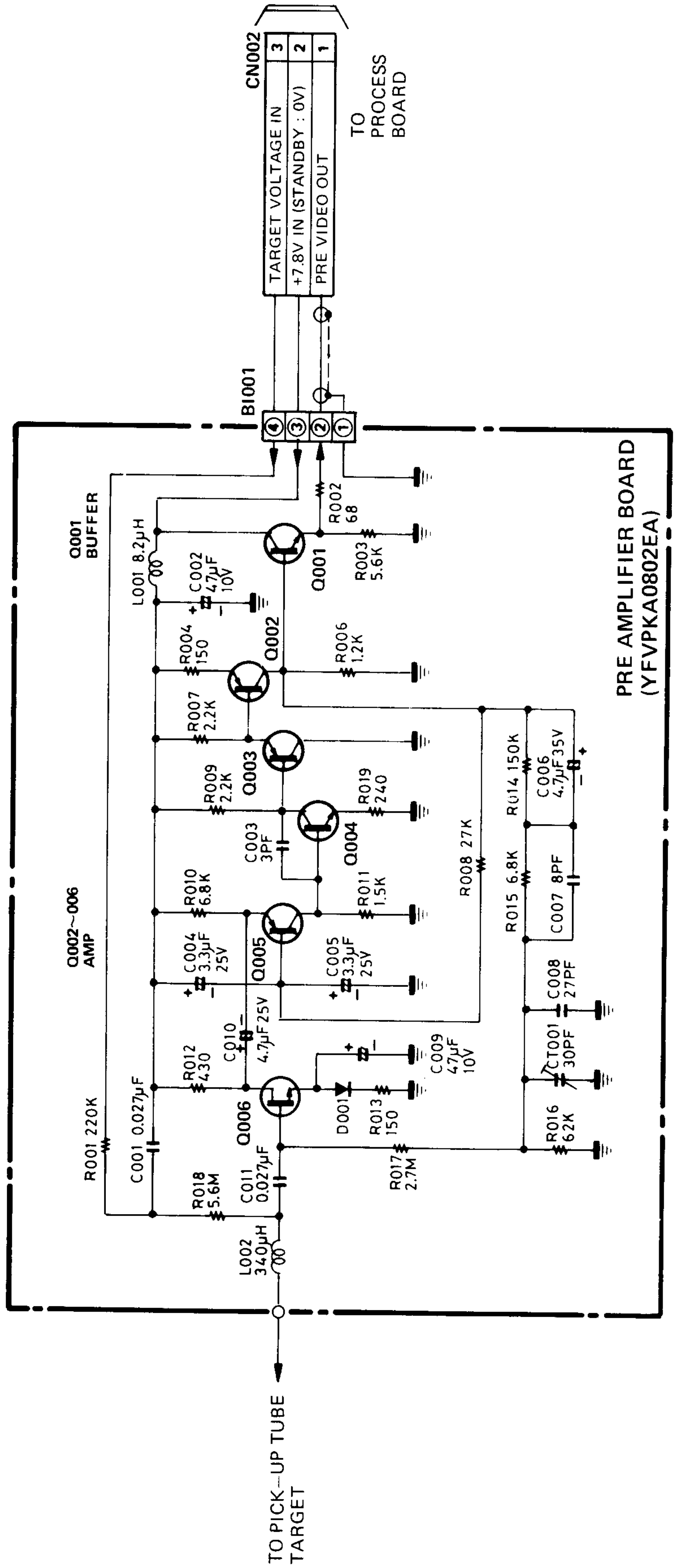


Where : L002; Percival coil

Co : Output capacitance of pick-up tube

Ci : Input capacitance of pre-amp

Fig. 2-3



CN002
3 TARGET VOLTAGE IN
2 +7.8V IN (STANDBY : 0V)
1 PRE VIDEO OUT
TO PROCESS BOARD
B1001
PRE AMPLIFIER BOARD (YFVPKA0802EA)
Q001 BUFFER
Q002~006 AMP
L001 8.2μH
C002 4.7μF 10V
R002 68
R003 5.6K
Q001
R004 150
Q002
R006 1.2K
R007 2.2K
Q003
R009 2.2K
R019 240
C003 3PF
Q004
R008 27K
R014 150K
C006 4.7μF 35V
R015 6.8K
C007 8PF
R010 6.8K
R011 1.5K
Q005
C004 3.3μF 25V
C005 3.3μF 25V
C010 4.7μF 25V
C008 27PF
CT001 30PF
R012 430
C009 47μF 10V
D001
R013 150
Q006
R016 62K
R001 220K
C001 0.027μF
R018 5.6M
C011 0.027μF
R017 2.7M
L002 340μH
TO PICK-UP TUBE TARGET

Fig. 2-4 Preamplifier

3 Deflection Board (YFVPKB1001EA)

The Deflection Board contains following circuits.

PAGE
3-1 +4.8V/+8.6V Regulator Circuit 8
3-2 +6V Regulator Circuit 10
3-3 Audio Amplifier Circuit 10
3-4 Zoom Control Circuit 11
3-5 Horizontal Deflection Circuit 11
3-6 Horizontal Linearity Correction Circuit 12
3-7 Vertical Deflection Circuit 13
3-8 Target Voltage Setting Circuit 13
3-9 Cathode Blanking/Beam Detect Circuit 14
3-10 Bias Light Circuit 15
3-11 High Voltage Circuit 15
3-12 EVF Video Amplifier Circuit 16
3-13 EVF Vertical Deflection Circuit 16
3-14 EVF Horizontal Oscillation Circuit 17
3-15 Standby Circuit 17
3-16 Playback Control Circuit 18

3-1 +4.8V/+8.6V Regulator Circuit

The +12V DC power from the portable VTR or the power supply is applied through terminal No. 10 of VTR connector CN110 and terminal No. 4 of CN010 to the emitter of Q002 and Q001 through L001 respectively. +5V DC is generated inside IC001 and used as sub-power inside IC001.

55KHz triangular signal is also generated in triangle oscillator (OSC) inside IC001 and fed to the +4.8V regulator and +8.6V regulator circuits.

+4.8V Regulator

In the +4.8V regulator, triangular signal Ⓐ supplied from triangle OSC inside IC001 and the DC voltage Ⓑ generated in +4.8V regulator whose level is set by VR001 (+4.8V/+8.6V ADJ) are compared and switching pulse Ⓒ whose width is controlled by the generated DC voltage is appears at pin 7 of IC001. This switching pulse is then applied to the base of switching transistor Q002 switching ON and OFF Q002.

As a result, the DC voltage whose level is set by the switching pulse width (pulse duty) is obtained at the output of switching regulator circuit consisting of Q002, D002 and L003. The generated DC voltage is fed back to +4.8V regulator through pin 5 of IC001 to maintain constant output voltage.

VR001 is adjusted for +4.8V.

The regulated +4.8V is then supplied to the each circuit boards as a power through the filters consisting of L003/C005 and L005/C014.

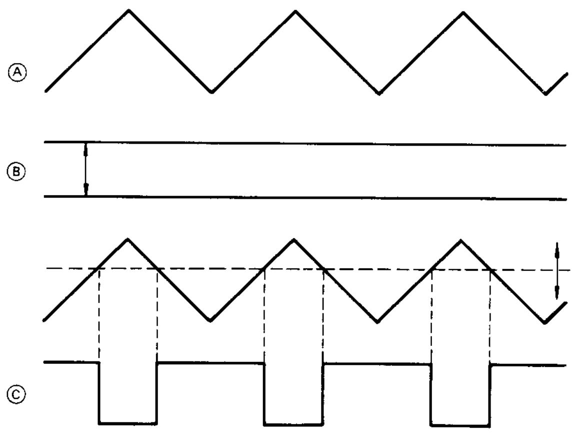


Fig. 3-1-1 +4.8V/+8.6V Regulator

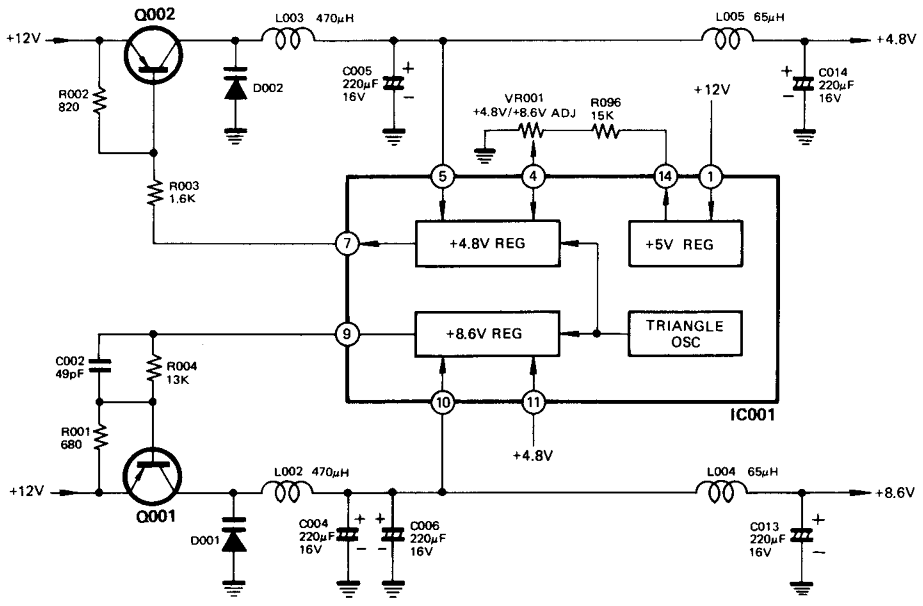


Fig. 3-1-2 +4.8V/+8.6V Regulator Circuit

+8.6V Regulator

+8.6V DC is similarly generated as +4.8V regulator circuit.

The DC voltage whose level is set by the regulated +4.8V through pin 11 of IC001 is generated in +8.6V regulator inside IC001.

In the +8.6V regulator, triangular signal generated in triangle OSC inside IC001 and DC voltage are compared and switching pulse is generated. This generated switching pulse is then applied to the base of switching transistor Q001 to control Q001 ON and OFF.

The resultant DC voltage whose level is set by the switching pulse's duty is obtained at the output of switching regulator circuit consisting of Q001, fly wheel diode D001 and L002. The generated DC voltage is fed back to +8.6V regulator inside IC001 through pin 10 to maintain constant output.

The regulated +8.6V is supplied to the each circuit boards as a power through the filters consisting of L002/C004/C006 and L004/C013.

Protection Circuit

This circuit detects the currents flow from the +4.8V-/+8.6V regulator circuits.

Under normal condition, +8.6V is applied to pin 5 and pin 6 of comparator IC002(b) through R013 and L004-/R012 and potential at pin 7 of comparator output set to low(L).

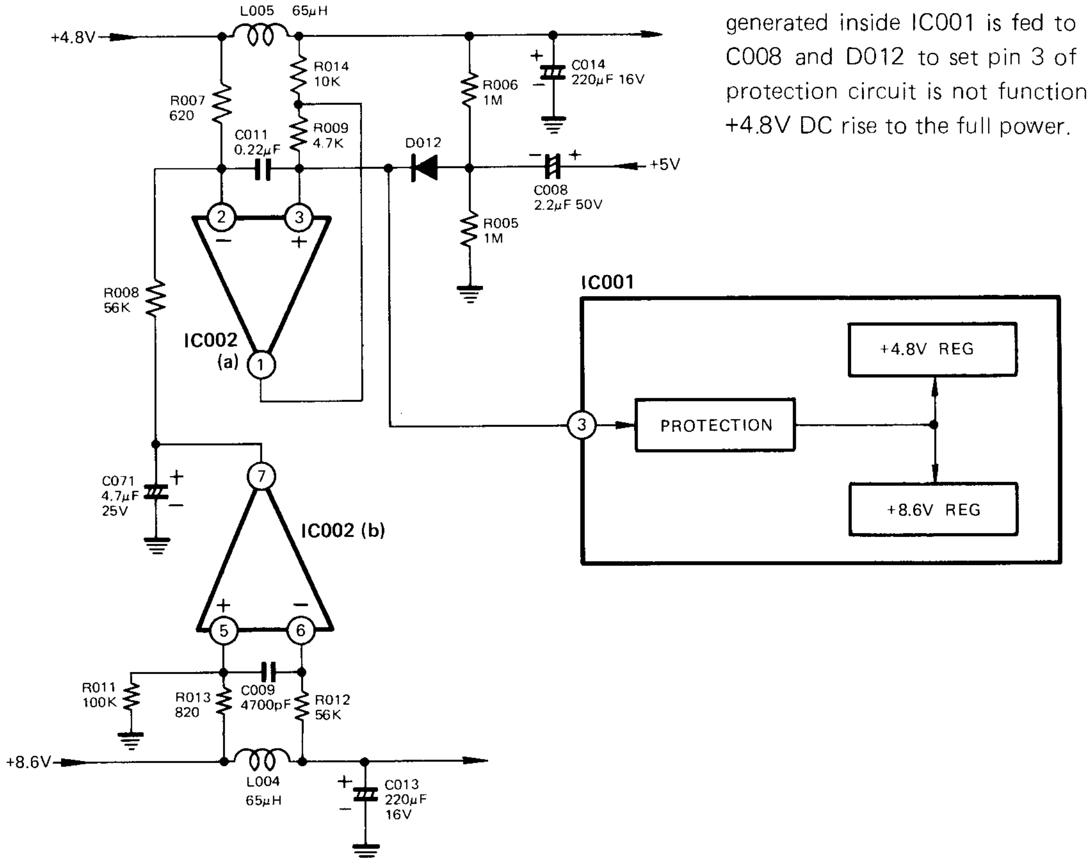


Fig. 3-1-3 Protection Circuit

+4.8V is supplied to pin 2 and pin 3 of another comparator IC002(a) through R007 and L005/R014/R009. However, the (L) at pin 7 of IC002(b) is fed to pin 2 of comparator IC002(a) through R008 and potential at pin 2 is lower than that of pin 3 thus comparator output at pin 1 is set to high(H).

When the high potential is supplied to protection circuit inside IC001 through R009 and pin 3 of IC001, +4.8V-/+8.6V are generated normally.

If over-current flows on +8.6V line, voltage drop appears at L004 according to the resistance of L004 and potential at pin 6 becomes lower to change comparator output at pin 7 from (L) to (H). This (H) is then fed to pin 2 of another comparator through R008 and the (L) at pin 2 to change output potential at pin 1 from (H) to (L). This (L) is fed to pin 3 of IC001 through R009.

When the potential at pin 3 of IC001 becomes (L), protection circuit start to operate to stop generating the DC voltage at +4.8V/+8.6V regulators inside IC001 thus no +4.8V/+8.6V are generated.

If over-current flows on +4.8V line, voltage drop appears at L005 and potential at pin 3 becomes lower to change comparator output potential at pin 1 of IC002(a) from (H) to (L).

This (L) through R009 and pin 3 of IC001 is start operate protection circuit inside IC001 to stop generating +4.8V/+8.6V power.

When the camera power is first turned ON, +5V DC generated inside IC001 is fed to pin 3 of IC001 through C008 and D012 to set pin 3 of IC001 high so that the protection circuit is not functioned until +8.6V DC and +4.8V DC rise to the full power.

3-2 +6V Regulator Circuit

Outline

+6V DC is generated by regulating +8.6V generated in the +8.6V regulator circuit.

This +6V is used as sub-power supply for other circuits.

Details

The +6V DC is generated by regulating +8.6V DC power using IC003(a), Q016 and Q017.

The output voltage of Q016/Q017 is applied to pin 2 of IC003 to form a feedback loop, and thus stabilizing the voltage. The reference voltage is obtained by dividing the +8.6V using R067 and R068.

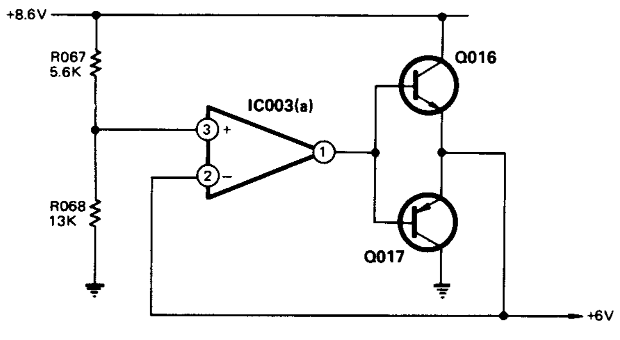

+8.6V
R067
5.6K
R068
13K
IC003(a)
③ +
② −
①
Q016
Q017
+6V

Fig. 3-2 +6V Regulator Circuit

3-3 Audio Amplifier Circuit

Outline

This circuit amplifies the output from the mounted boom microphone or external microphone.

The amplified audio signal is sends out to the VTR for recording and to the earphone jack on the rear of the camera for audio monitoring.

Details

The -72dB output from the electret condenser microphone (which is mounted on the camera), or an external microphone is supplied to audio amplifier consisting of Q007 and IC003(b), where it is amplified +52dB. The -20dB audio output at pin 7 of IC003 is sent directly to the portable VTR or via power supply to the table model VTR through terminal No. 2 of CN010 and terminal No. 7 of VTR connector CN110, and earphone jack CN107 through terminal No. 2 of CN007.

The amplified audio signal at pin 7 of IC003 is also fed to D003 and peak-rectifier consisting of Q010, R036, R038 and C026 where it is converted into DC voltages. The rectified DC voltages are supplied to the base of Q009 to control the resistance between the collector and emitter of Q009.

When the audio signal level at pin 7 of IC003 increases, the DC voltage at the base of Q009 also increases and resistance between collector and emitter decreases. Therefore, the audio signal level at pin 5 of IC003 decreases.

When the audio signal level at pin 7 of IC003 decreases, the reverse operation takes place.

In this way, the audio signal output level is kept constant.

The audio signal level is also controlled by the fade control signal supplied from Process board through Q011.

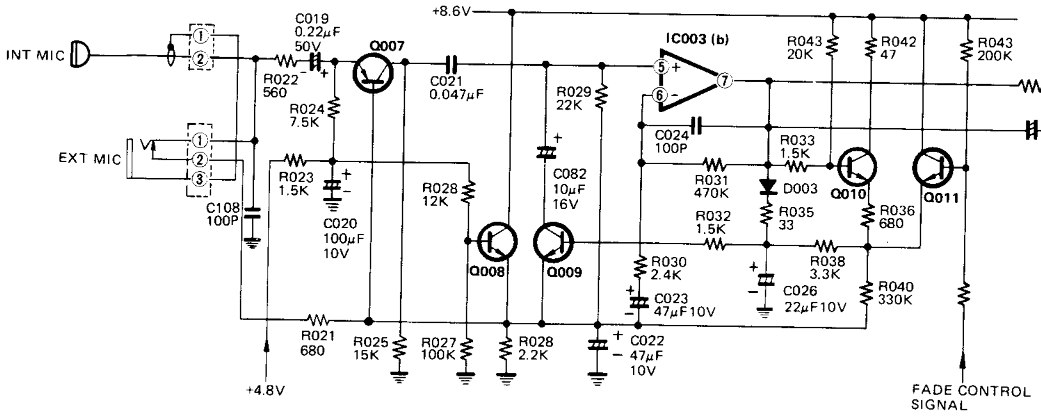

INT MIC
EXT MIC
①
②
①
②
③
C019
0.22μF
50V
R022
560
Q007
R024
7.5K
R023
1.5K
C020
100μF
10V
C108
100P
C021
0.047μF
+8.6V
R028
12K
Q008
Q009
C082
10μF
16V
R029
22K
IC003 (b)
⑤ +
⑥ −
⑦
C024
100P
R031
470K
R032
1.5K
R030
2.4K
C023
47μF10V
D003
R033
1.5K
R035
33
C026
22μF10V
R038
3.3K
R043
20K
R042
47
Q010
R036
680
R040
330K
Q011
R043
200K
AUDIO OUT
EARPHONE OUT
R021
680
R025
15K
R027
100K
R028
2.2K
C022
47μF
10V
+4.8V
FADE CONTROL
SIGNAL

Fig. 3-3 Audio Amplifier Circuit

3-4 Zoom Control Circuit

Outline

This circuit drives zoom lens motor.

Details

When the TELE switch SW102 on the handle grip is depressed, the base of Q004 shorted to the ground and turn ON Q004 and Q005. Therefore, the current flows into the zoom motor through Q005 and Q004 for zoom-in (telephoto) operation.

When the WIDE switch SW103 is depressed, Q006 and Q003 turn ON. Therefore, the current flows into the zoom motor (in the reverse direction) through Q003 and Q006 for zoom-out (wide angle) operation.

SW002 on the IRIS/COLOR Adjust board is a zoom speed switch to set the zoom speed by changing the DC voltage at the base of Q004 and Q006.

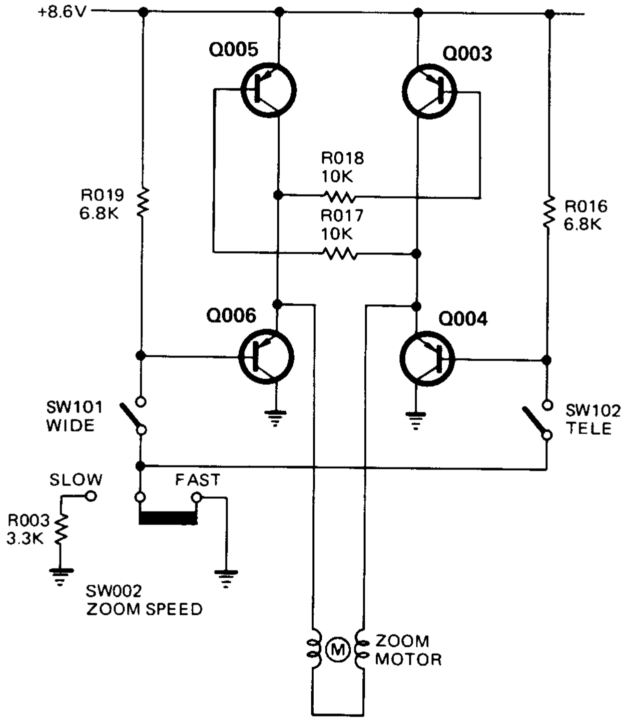

+8.6V
Q005
Q003
R018
10K
R017
10K
R019
6.8K
R016
6.8K
Q006
Q004
SW101
WIDE
SW102
TELE
SLOW
FAST
R003
3.3K
SW002
ZOOM SPEED
M
ZOOM
MOTOR

Fig. 3-4 Zoom Control Circuit

3-5 Horizontal Deflection Circuit

Outline

This circuit generates the sawtooth current for the horizontal(H) beam deflection inside the pick-up tube, supplying it to the pick-up tube H. deflection coil.

Details

The horizontal scanning start(Hs) pulse supplied from the Process board (YFVPKC1001EA) goes via inverter Q013 to horizontal deflection output Q014. When Q014 is switched on by the Hs pulse from Q013, the collector current pulse at Q014 resonates with L006 and C033, and the resultant horizontal sawtooth current is generated and supplied to the pick-up tube horizontal deflection coil through terminal No. 4 of CN004. VR002 (H. SIZE) is a control for adjusting the horizontal scanning size.

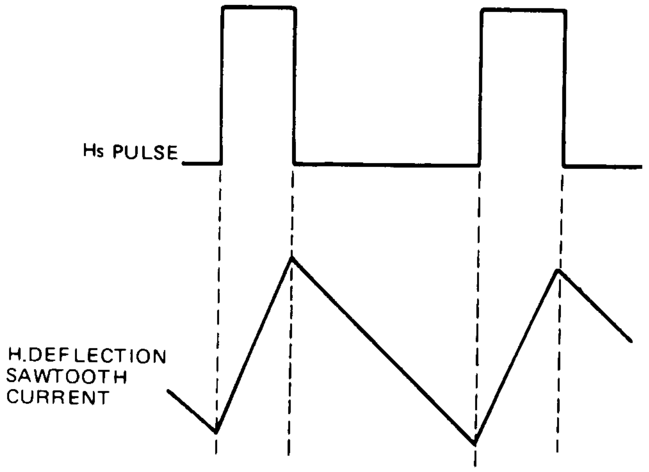


Fig. 3-5-1 Horizontal Deflection

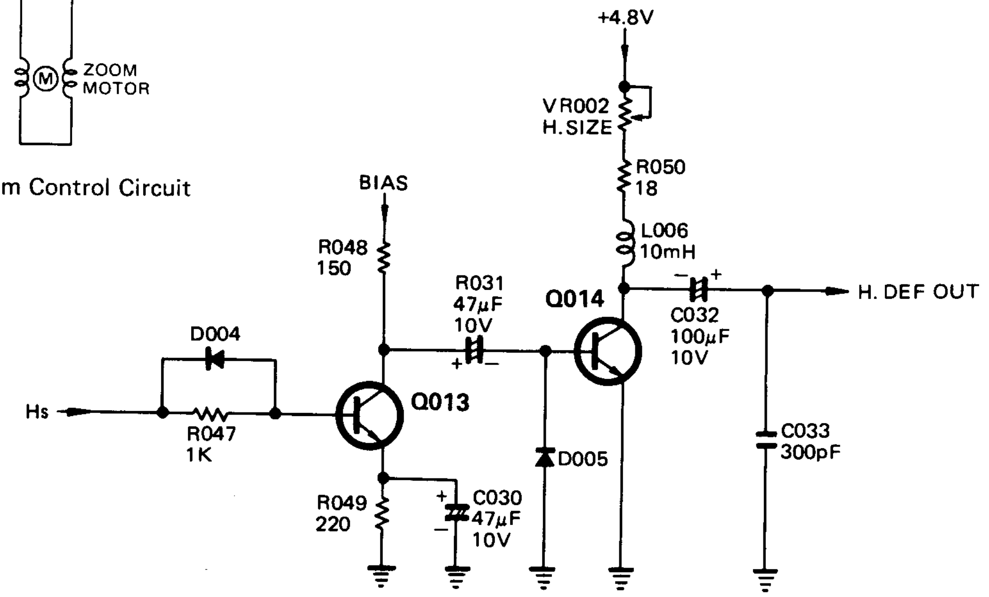

+4.8V
VR002
H.SIZE
R050
18
L006
10mH
BIAS
R048
150
D004
Hs
R047
1K
Q013
R031
47μF
10V
Q014
C032
100μF
10V
H. DEF OUT
D005
R049
220
C030
47μF
10V
C033
300pF

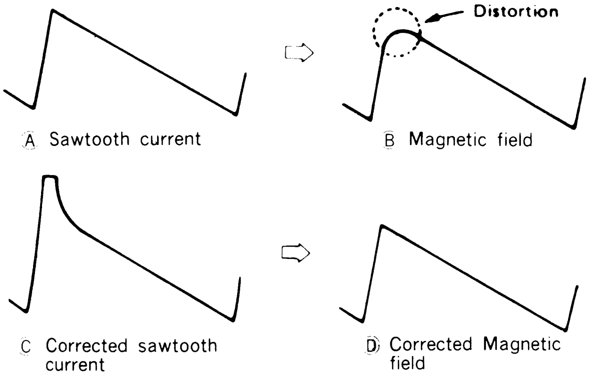
Fig. 3-5-2 Horizontal Deflection Circuit

3-6 Horizontal Linearity Correction Circuit

Outline

The horizontal (H) deflection circuit is of a switching type, so that the generated sawtooth current waveform has poor linearity. By feeding the sawtooth current to the deflection coil, the intensity of the magnetic field generated in the deflection coil is not linear as the pick-up tube's electron beam is deflected. If a linear sawtooth current Ⓐ is sent to the deflection coil, however, the magnetic field in the scanning start portion is distorted Ⓑ due to the effect of the pick-up tube's electrodes, coil hysterisis, etc. As a result, the linearity of the scanning start portion deteriorates, and a shading (unevenness of amplitude) appears on the left edge of the picture.

Therefore, in order to generate a linear magnetic field intensity Ⓓ and to correct the linearity and shading of the scanning start portion, it is necessary to feed a nonlinear sawtooth signal Ⓒ to the deflection coil.



Ⓐ Sawtooth current

Ⓑ Magnetic field

Ⓒ Corrected sawtooth current

Ⓓ Corrected Magnetic field

Fig. 3-6-1 Horizontal Linearity Correction-1

This circuit generates a waveform to "correct" the linearity of horizontal sawtooth current waveform and its starting portion. As shown in Fig. 3-6-1, the horizontal deflection circuit is connected to one end of the horizontal deflection coil, and the horizontal linearity correction circuit to the other end.

Fig. 3-6-2

Details

The horizontal(H) flyback pulse Ⓔ produced from the collector of Q014 in the H. deflection circuit is integrated by L007 and R055 into a sawtooth signal Ⓕ. This sawtooth signal is again integrated by L007, R053 and C035 into a parabola signal Ⓖ, which is applied through R054 to pin 2 of differential amplifier IC004 (a) as a H. linearity correction signal.

The H. flyback pulse Ⓔ from Q014 is integrated by R56 and C036 into a linearity correction signal Ⓗ for correcting the linearity of the starting portion of the horizontal sawtooth current waveform. The starting portion linearity correction signal Ⓗ is applied to pin 3 of IC004 where the linearity correction signal Ⓖ and the starting portion linearity correction signal Ⓗ are mixed and amplified.

The mixed signal Ⓘ of these linearity correction signals at pin 1 of IC004 is fed to the H. deflection coil to correct the linearity of the horizontal sawtooth current waveform. L007 (H. LIN-1) is a control for adjusting the overall linearity of sawtooth current and VR003 (H. LIN-2) for adjusting the linearity of the starting portion. VR004 (H. CENTERING) is a centering control which controls the negative input potential of IC004 to change the direct current flowing to the H. deflection coil, and thus sets the horizontal scanning position on the pick-up tube.

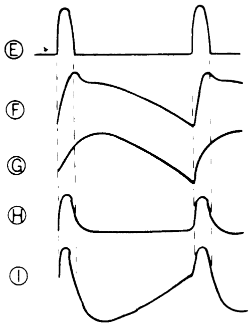


Fig. 3-6-2 Horizontal Linearity Correction-2

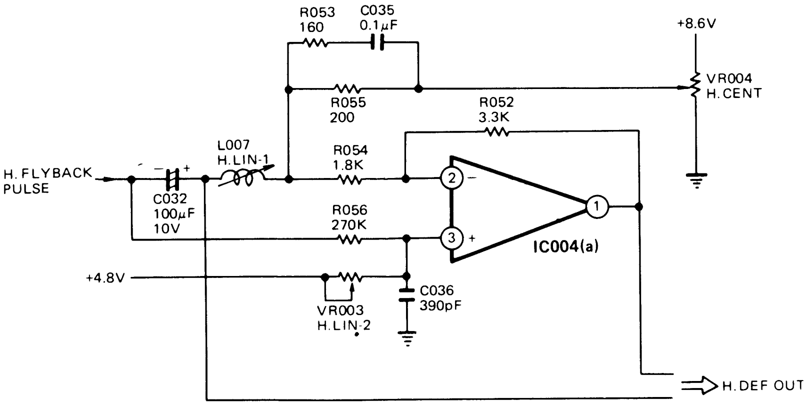


Fig. 3-6-3 Horizontal Linearity Correction Circuit

3-7 Vertical Deflection Circuit

Outline

This circuit generates a sawtooth current for the vertical-(V) beam deflection inside the pick-up tube, feeding it to the pick-up tube V. deflection coil.

Details

The vertical scanning start(Vs) pulse sent from the Process board (YFVPKC1001EA) is fed to sawtooth generator Q015 which converts it into a vertical rate sawtooth.

This sawtooth signal is applied to pin 6 of amplifier IC004, which produces an amplified vertical sawtooth signal from its output pin 7. This amplified signal is sent to the pick-up tube vertical(V) deflection coil. The sawtooth current flowing to the V. deflection coil is detected by R065 which is connected in series with the deflection coil, and fed back to sawtooth generator Q015, thus correcting the linearity of the vertical sawtooth waveform. Therefore, a linear sawtooth current flows into the pick-up tube V. deflection coil. VR005 (V.SIZE) is the control for changing the amplitude of the vertical deflection sawtooth waveform to set vertical scanning size. VR006 (V. CENTERING) is a centering control which controls the direct current flowing to the V. deflection coil to set the vertical scanning position on the pick-up tube.

3-8 Target Voltage Setting Circuit

Outline

The target voltage setting circuit supply the DC voltage to pick-up tube target.

Details

+70V DC supplied from the high voltage circuit is divided by R075, VR007 and R092 thus made +50V DC. This +50V DC is fed to pick-up tube target through process board and preamplifier board.

VR007 is a control for the target voltage.

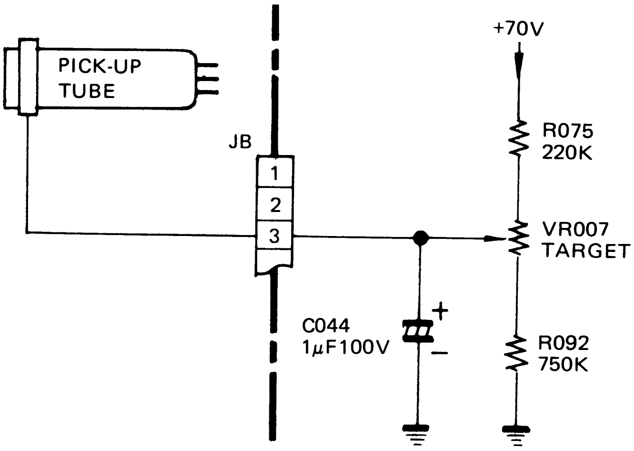

PICK-UP
TUBE
JB
1
2
3
+70V
R075
220K
VR007
TARGET
C044
1μF100V
+
−
R092
750K

Fig. 3-8 Target Voltage Setting Circuit

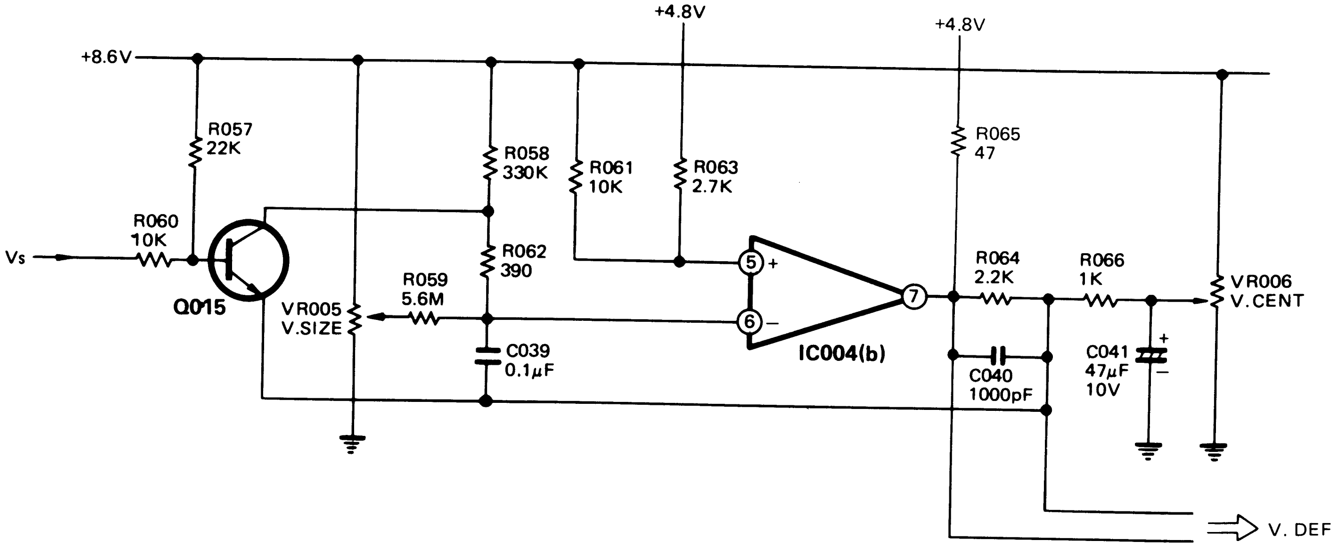

+8.6V
+4.8V
+4.8V
R057
22K
R058
330K
R061
10K
R063
2.7K
R065
47
R060
10K
Vs
Q015
VR005
V.SIZE
R059
5.6M
R062
390
C039
0.1μF
5
6
7
+
−
IC004(b)
R064
2.2K
R066
1K
C040
1000pF
C041
47μF
10V
VR006
V.CENT
V. DEF

Fig. 3-7 Vertical Deflection Circuit

3-9 Cathode Blanking/Beam Detect Circuit

Cathode Blanking Circuit Outline

This circuit generates a cathode blanking pulse and supplies it to the pick-up tube cathode(K) in order to eliminate the retrace scanning lines.

Details

The horizontal(H) flyback pulse at the collector of H.deflection output Q014 and the vertical scanning start (Vs) pulse from the Process board through flat cable JC, inverter Q019 and Q018 are supplied to base of the switching amplifier Q020 respectively.

The mixed signal obtained at the emitter of Q020 is supplied to the cathode(K) of pick-up tube through terminal No. 3 of BI004 as a cathode blanking pulse.

Beam Detect Circuit Outline

This circuit detects the current flow from the pick-up tube cathode (K) and generates the control signal. This control signal is then fed to the Micro processor board to control the automatic iris control (AIC) lens and automatic white balance control (AWC) circuit.

Details

When the power switch is initially turned ON, it takes some times for cathode of the pick-up tube to be heated sufficiently in order to emit electrons at full force. Therefore, during initial period of the time after turn on the power switch, no current flow from the cathode (K) of the pick-up tube to Q020 and no DC bias apply to the base of Q021 thus Q021 stays off and potential at the collector of Q021 stays high(H).

This high potential at the collector of Q021 is fed through flat cable JA to the Micro processor board to set the automatic iris control (AIC) lens to close iris position in order to protect the pick-up tube from the burning. (Refer to Automatic Iris Control circuit in Micro processor board.)

Also this high potential supplied through the Micro processor board reset the automatic white balance control (AWC) circuit in Process board. (Refer to Automatic White Balance Control circuit in Process board.)

After the pick-up tube warm up, current flows from the cathode normally then DC bias obtained at the base of Q021 to turn Q021 ON and potential at the collector of Q021 becomes low (L).

This low potential is supplied to the Micro processor board to operate AIC lens and AWC circuit normally.

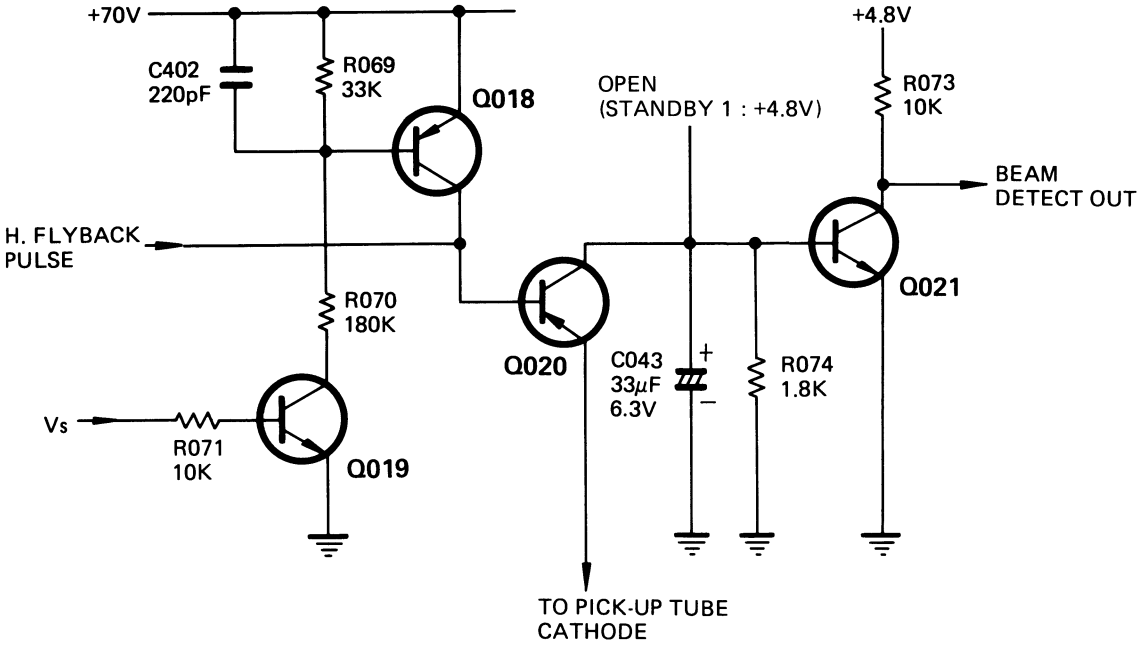


Fig. 3-9 Cathode Blanking/Beam Detect Circuit

3-10 Bias Light Circuit

Outline

The pick-up tube produces dark current when the light is blocked by capping the lens for example.

The dark current of pick-up tube is extremely small comparing with vidicon. Therefore, when the camera is aimed at the dark scene, potential at the photoconductive(target) layer of pick-up tube becomes lower than that of vidicon and the electron beam becomes insufficient to discharge the target. As a result, the beam does not respond to the variation of incoming light intensity to the pick-up tube and lag increases. (When a moving object is shot, or when the camera is panned, a trailing image is exhibited. This trailing image is called lag.)

In order to minimize the lag, bias light LEDs are positioned in front of pick-up tube for increasing the light intensity reaches the pick-up tube.

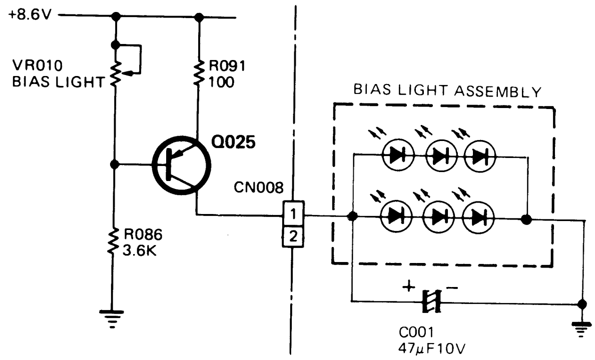

+8.6V
VR010
BIAS LIGHT
R091
100
Q025
CN008
1
2
R086
3.6K
BIAS LIGHT ASSEMBLY
+
−
C001
47µF10V

Fig. 3-10 Bias Light Circuit

Details

The DC current adjusted by VR010(BIAS LIGHT) flows into bias light LEDs in the bias light assembly through Q025 and pin 1 of CN008 to light them in order to keep the light intensity reaches the pick-up tube at certain level.

VR010 adjusts the brightness of LEDs.

3-11 High Voltage Circuit

Outline

This circuit generates high voltages needed for the pick-up tube.

Details

The pre-blanking(PRE BL) pulse generated in the Process board is supplied to the primary winding of step-up transformer in high voltage pack T001 through flat cable JC, inverter Q023 and driver Q024 to step up the PRE-BL pulse to necessary level.

The boosted pulses obtained at the secondary winding of step-up transformer are rectified to generate high voltages.

The high voltages are derived as follows.

The -70V obtained at pin 2 of T001 and rectified by D010 is fed to grid-1(G1) through VR011(BEAM). The +350V at pin 9 of T001 and rectified by D008 is applied to grid-2(G2) directly. +1.5kV obtained at pin 10 of T001 is supplied to grid-6(G6). The voltages for grid-4(G4) and grid-5(G5) are obtained by dividing +1.5kV by block resistor Z001 and VR015(FOCUS) in Z001. The +70V obtained at pin 5 of T001 and rectified by D009 is fed to cathode blanking circuit and target voltage setting circuit.

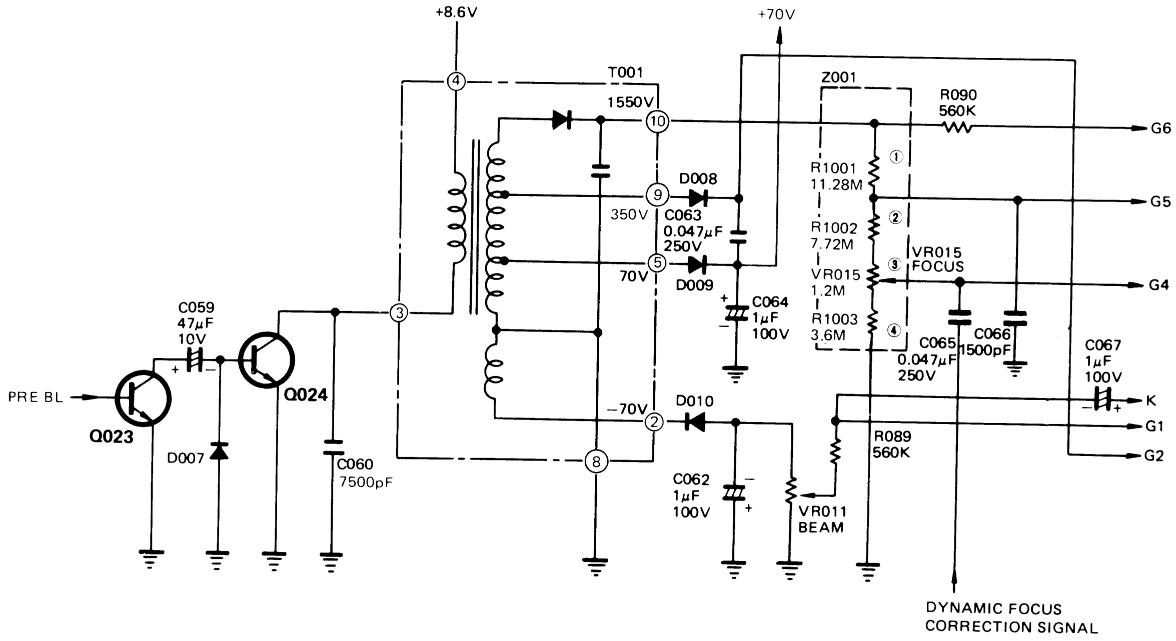

+8.6V
+70V
T001
1550V
④
⑩
⑨
⑤
③
②
⑧
350V
70V
−70V
D008
C063
0.047µF
250V
D009
C064
1µF
100V
D010
C062
1µF
100V
VR011
BEAM
Z001
R090
560K
R1001
11.28M
R1002
7.72M
VR015
1.2M
R1003
3.6M
VR015
FOCUS
C065
0.047µF
250V
C066
1500pF
C067
1µF
100V
R089
560K
G6
G5
G4
K
G1
G2
C059
47µF
10V
PRE BL
Q023
Q024
D007
C060
7500pF
DYNAMIC FOCUS
CORRECTION SIGNAL

Fig. 3-11 High Voltage Circuit

3-12 EVF Video Amplifier Circuit

Outline

This circuit amplifies the video signal supplied from the Process board and fed it to the cathode ray tube(CRT) together with the level indicator signal which indicates the video level and character signal which generated in the Micro processor board for graphics display on the CRT screen.

Details

The PAL signal from the Process board is applied to pin 18 of IC005 through trap CF004 which located on the Process board for removing the chrominance components in the PAL signal and flat cable JC. The video signal is clamped and amplified at inside IC005 then mixed with level indicator signal and character signal. The mixed signal obtained at pin 24 of IC005 is supplied to grid-1(G1) of the CRT through buffer Q001 on the EVF connector board, VR002(CONTRAST) and amplifier Q002 in the Viewfinder board.

3-13 EVF Vertical Deflection Circuit

Outline

This circuit generates vertical deflection sawtooth current for vertical scanning of beam inside the cathode ray tube(CRT).

Details

The video signal from the Process board is supplied to the sync separator in IC005 through flat cable JC and pin 18 of IC005.

The sync separator in IC005 detects only sync pulse of video signal and V. sync pulse and H. sync pulse are made.

The vertical(V) sync pulse generated in the sync separation circuit is fed to V. oscillator (V.OSC) inside IC005 as a trigger pulse. the V. OSC is a free-running sawtooth generator whose frequency is approximately 45Hz. When the trigger pulse is supplied to the V.OSC circuit, it generates a 50Hz sawtooth signal.

The V. sawtooth signal obtained at pin 7 is fed to amplifier through pin 6 of IC005, where it is amplified. The amplified V. sawtooth signal at pin 5 of IC005 is fed to the CRT V. deflection coil through terminal No. 4 of CN005.

VR008 (EVF V.SIZE) is a control for vertical scanning size.

The V. sync pulse obtained at pin 13 of IC005 is supplied to Micro processor board through flat cable JA.

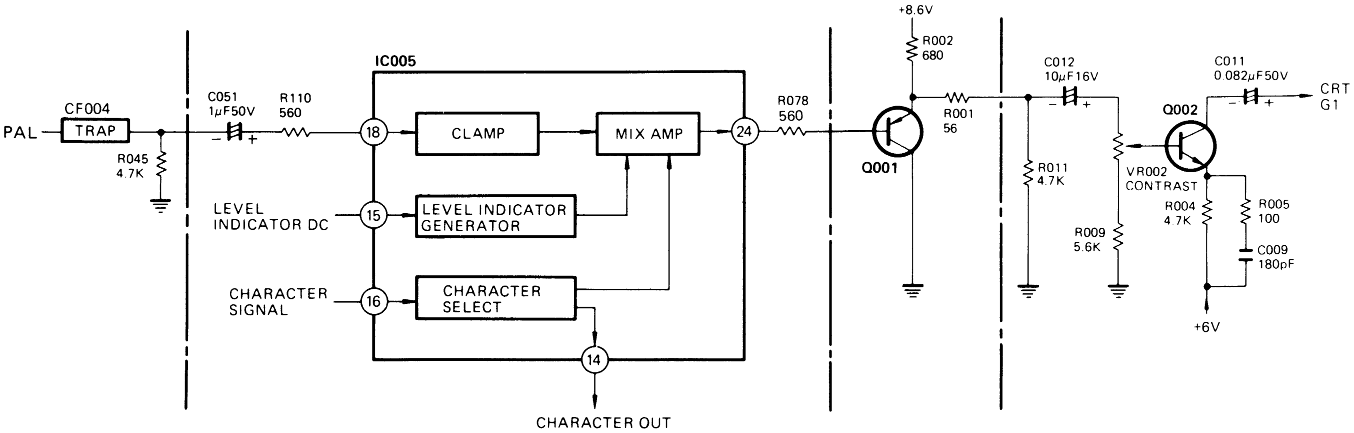

IC005
PAL
CF004
TRAP
R045
4.7K
C051
1μF50V
R110
560
18
CLAMP
MIX AMP
24
R078
560
LEVEL INDICATOR DC
15
LEVEL INDICATOR GENERATOR
CHARACTER SIGNAL
16
CHARACTER SELECT
14
CHARACTER OUT
+8.6V
R002
680
R001
56
Q001
C012
10μF16V
R011
4.7K
R009
5.6K
VR002
CONTRAST
Q002
C011
0.082μF50V
CRT
G1
R004
4.7K
R005
100
C009
180pF
+6V

Fig. 3-12 EVF Video Amplifier Circuit

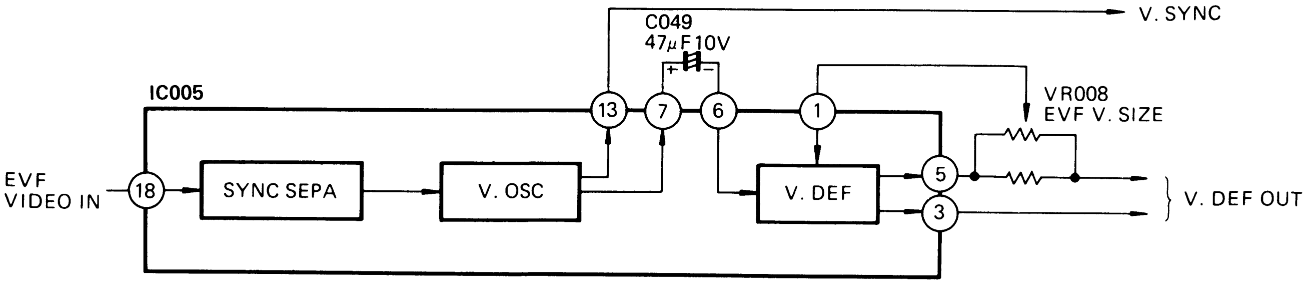

V. SYNC
C049
47μF10V
IC005
13
7
6
1
VR008
EVF V. SIZE
EVF VIDEO IN
18
SYNC SEPA
V. OSC
V. DEF
5
3
V. DEF OUT

Fig. 3-13 EVF Vertical Deflection Circuit

3-14 EVF H. Oscillation Circuit

Outline

This circuit controls the frequency (phase) of the horizontal sawtooth current to correspond to that of horizontal(H) sync pulse separated from video signal.

Details

The horizontal(H) sync pulse from the sync separator is applied to phase comparator inside IC005. The H. oscillation signal from the H. oscillator (H.OSC) circuit inside IC005 also fed to phase comparator and compared with the H. sync pulse in phase. The DC voltage corresponding to the phase difference is fed to H.OSC to control its oscillation frequency. In this way, the H. OSC is automatically controlled to match its oscillation frequency with that of sync pulse.

VR009(H.HOLD) is a control for setting the oscillation frequency in a steady state.

The frequency controlled H. drive(H.D) pulse obtained at pin 22 of IC005 is then fed to the EVF board through terminal No. 3 of CN005 to generate H. deflection sawtooth current.

The H. sync pulse obtained at pin 23 is supplied to Micro processor board through flat cable JA.

3-15 Standby Circuit

Outline

When recording outdoors, using camera and VTR, the power reserve of the battery must be conserved as much as possible, which is the exact function of the standby circuit.

Details

When the standby switch SW001 on the Standby board is set to "ON" position, practically all circuits in the camera and the VTR are operational, that is, the power from +4.8V/+8.6V sources are supplied to all electric circuits in the Deflection, Process, Micro processor, Auto focus and Viewfinder boards in the camera and +12V power is consumed in the VTR.

When the standby switch SW001 on the rear of the camera is set to "STANDBY-1" position, +8.6V power source goes only to the +6V DC regulator to preheating the heater of pick-up tube and cathode ray tube (CRT) and the REC CONTROL circuit on the process board in order to set the VTR to standby mode (REC/PLAY-PAUSE). At the same time, a standby signal (approx. +3V) is generated in the REC control circuit inside IC006 on Process board by detecting +1.8V (generated inside IC003 on Process board) and is supplied it to the VTR to set it to standby mode too.

In addition to this, +4.8V DC is only fed to IC002 (Micro Processor) on Micro Processor board, the REC CONTROL circuit and the Automatic White balance setting circuit(AWC) on Process board to remain the white balance information during the camera is in "STANDBY-1" mode.

Also +4.8V through terminal No. 4 of BI001 on the Standby board, terminal No. 6 of CN011 is fed to the base of Q021 to remain the collector Q021 high (H) in order to avoid reset the white balance condition.

When the standby switch SW001 is set to "STANDBY-2' position, only IC002 (Micro Processor) on Micro Processor board and IC005 on Process board are functioned in order to remain the VTR to standby mode (REC-/PLAY PAUSE). All other circuits are not functioned in order to conserve the battery.

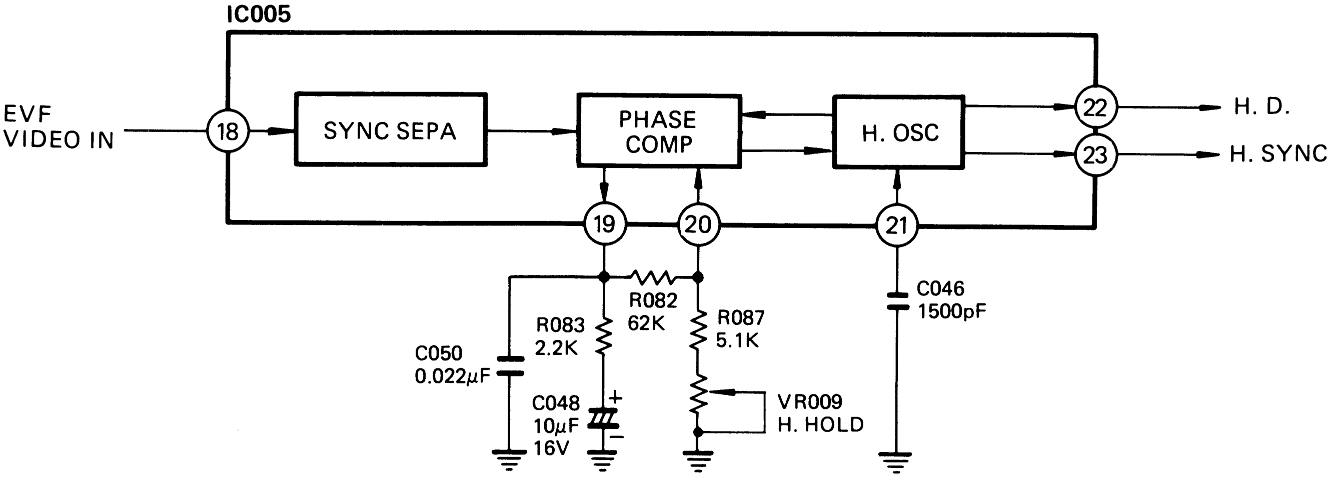


Fig. 3-14 EVF H. Oscillation Circuit

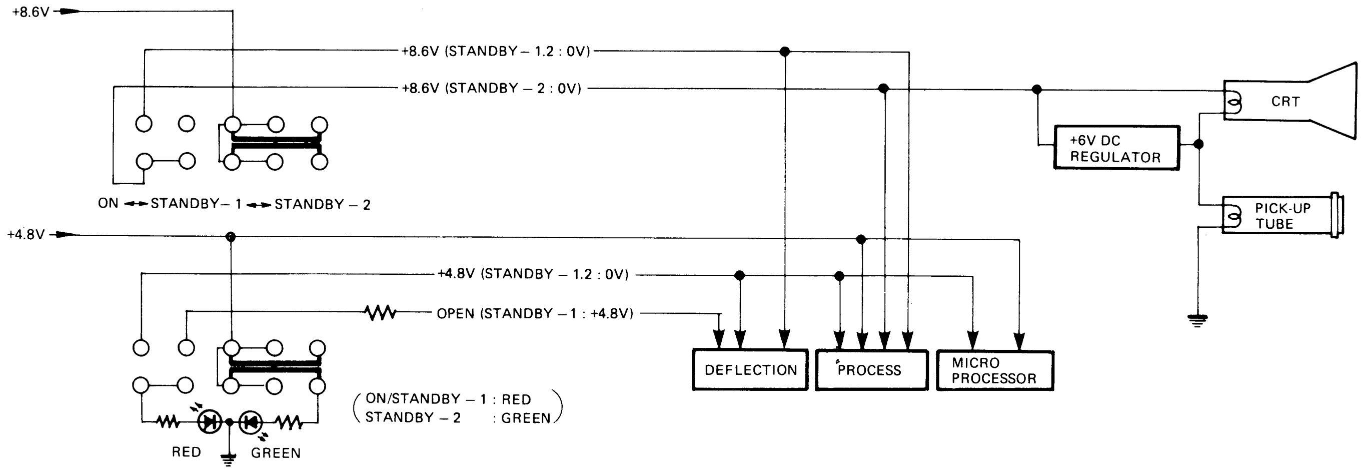

+8.6V
+8.6V (STANDBY – 1.2 : 0V)
+8.6V (STANDBY – 2 : 0V)
ON ↔ STANDBY – 1 ↔ STANDBY – 2
+4.8V
+4.8V (STANDBY – 1.2 : 0V)
OPEN (STANDBY – 1 : +4.8V)
ON/STANDBY – 1 : RED
STANDBY – 2 : GREEN
RED
GREEN
DEFLECTION
PROCESS
MICRO PROCESSOR
+6V DC REGULATOR
CRT
PICK-UP TUBE

Fig. 3-15 Standby Circuit

3-16 Playback Control Circuit

Outline

This circuit sense the recording or playback of the portable VTR.

When the portable VTR is set into the playback mode, this circuit shuts off the audio amplifier, horizontal(H) deflection and high voltage circuits and the playback signal from the VTR is supplied to the viewfinder. When the portable VTR is set into the recording mode, this circuit sets the all circuits in the camera to operating condition and PAL output signal is supplied to the viewfinder and the portable VTR for recording.

Details

When the portable VTR is set into the recording mode, no DC bias is applied to the base of Q012 and Q012 remains ON, and +4.8V at the emitter of Q012 is supplied through its collector to the audio amplifier, H.deflection and high voltage circuits to function these circuits normally.

When the portable VTR is set into the playback mode, the playback signal which rides on top of +6V DC is supplied from the VTR to the base of Q012.

Q012 is turned off by the +6V and the +4.8V at the emitter is not supplied to the audio amplifier, H.deflection and high voltage circuits and no high voltages generated.

In this way, the PAL signal is not generated in the camera and the playback signal from the portable VTR is supplied to the viewfinder.

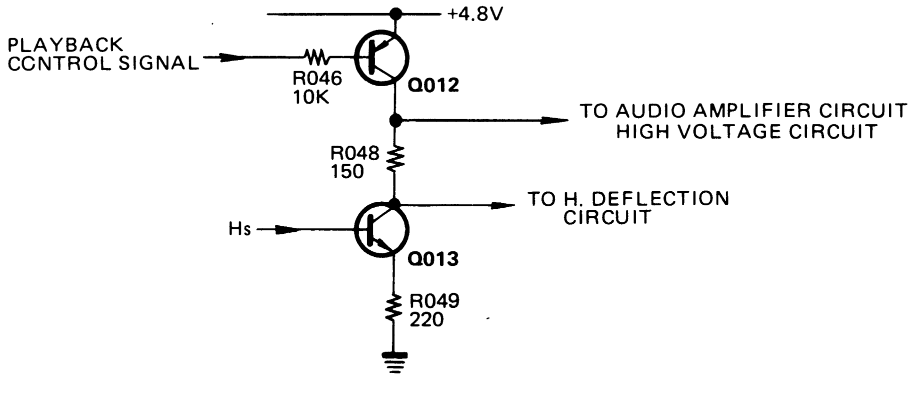

+4.8V
PLAYBACK CCNTROL SIGNAL
R046 10K
Q012
TO AUDIO AMPLIFIER CIRCUIT HIGH VOLTAGE CIRCUIT
R048 150
TO H. DEFLECTION CIRCUIT
Hs
Q013
R049 220

Fig. 3-16 Playback Control Circuit

4 Process Board (YFVPKC1001EA)

The Process Board contains following circuits.

Page
4-1. Pulse Generator Circuit 19
4-2. Signal Processing Circuit 21
  4-2-1. Bias light Shading Correction Circuit .. 21
  4-2-2. Optical Black Clamp Circuit 21
  4-2-3. Gamma Correction Circuit 23
  4-2-4. Automatic Iris Control Detection 23
  4-2-5. Automatic Gain Control Circuit 24
4-3. Luminance Signal Processing Circu.... 25
  4-3-1. YH Signal Circuit 25
  4-3-2. YL Signal Circuit 25
  4-3-3. Y(edge) Signal Circuit 26
4-4. Horizontal Aperture Signal Generator Circuit 26
4-5. Vertical Edge Signal Generator Circuit...................... 27
4-6. Red and Blue Separation & Chroma Processing Circuit 28
  4-6-1. Red and Blue Separation Circuit...... 28
  4-6-2. Vertical Transient Spurious Correction Circuit............... 30
  4-6-3. Shading Correction Circuit 31
  4-6-4. Tracking Correction Circuit 31
  4-6-5. R-YL Signal Circuit.............. 33
  4-6-6. B-YL Signal Circuit 34
  4-6-7. Chroma Clip Signal Circuit 34
4-7. Chrominance Encoding Circuit....... 35
  4-7-1. +2.5V Power Circuit 35
  4-7-2. Chrominance Signal Generator Circuit...................... 35
  4-7-3. Chroma Clip/Suppress Circuit 36
  4-7-4. White Set Detection Circuit......... 36
4-8. Burst Generator Circuit 37
4-9. PAL Signal Processing Circuit 37
4-10. Playback Detect Circuit 39
4-11. White Balance Setting Circuit........ 39
4-12. VTR Remote Control/Fade Control Circuit...................... 41
  4-12-1. VTR Remote Control Circuit........ 41
  4-12-2. Fade Control Circuit 42

4-1 Pulse Generator Circuit

Outline

This circuit generates all sync pulses used in the camera.

Details

The crystal oscillator which consists of crystal oscillator X001, CT003 (4.43MHz ADJ) and C069 connected between pin 2 and pin 3 of sync generator IC011 oscillates 17.7MHz.

The voltage controlled oscillator (VCO) composed of L015, C106, C107, D011 and D012 is connected to pin 9 and pin 10 of IC011 and phase-compared with the frequency oscillated by the crystal oscillator.

The phase detected output from pin 8 of IC011 is sent to variable capacitance diodes D011 and D012 through R199 to drive them and control the VCO frequency. This phase lock loop (PLL) circuit always keeps interleaving relationship among subcarrier, horizontal and vertical frequency generated by IC011.

The following pulses are generated from IC011.

Pin 4 :	(B-Y)SC	(Subcarrier for B-Y modulation)
Pin 6 :	(R-Y)SC	(Subcarrier for R-Y modulation)
Pin 15 :	W.BL	(Wide blanking pulse)
Pin 16 :	BFP	(Burst flag pulse)
Pin 17 :	SYNC	(Composite sync pulse)
Pin 18 :	BL	(Composite blanking pulse)
Pin 19 :	Vs	(Vertical scanning start pulse)
Pin 20 :	Pre BL	(Preblanking pulse)
Pin 21 :	CP1	(Clamp pulse-1)
Pin 22 :	Hs	(Horizontal scanning start pulse)

The timing information for each pulse is shown in Fig. 4-1-1.

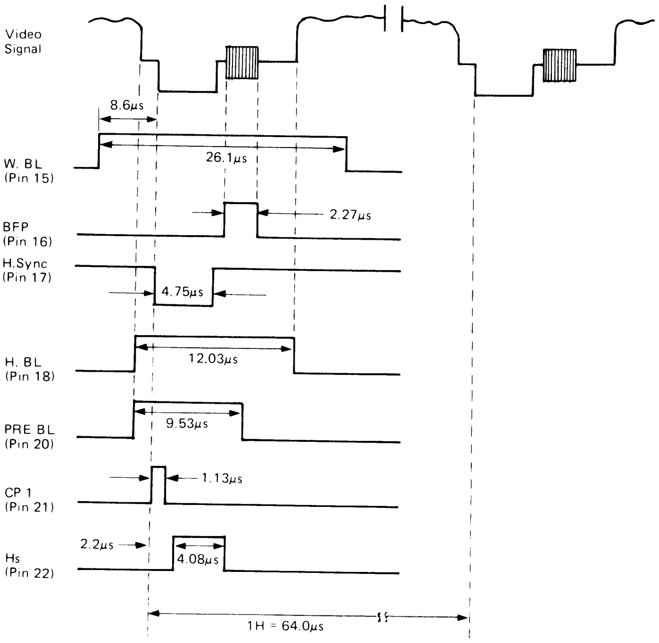


Fig. 4-1-1 Pulses

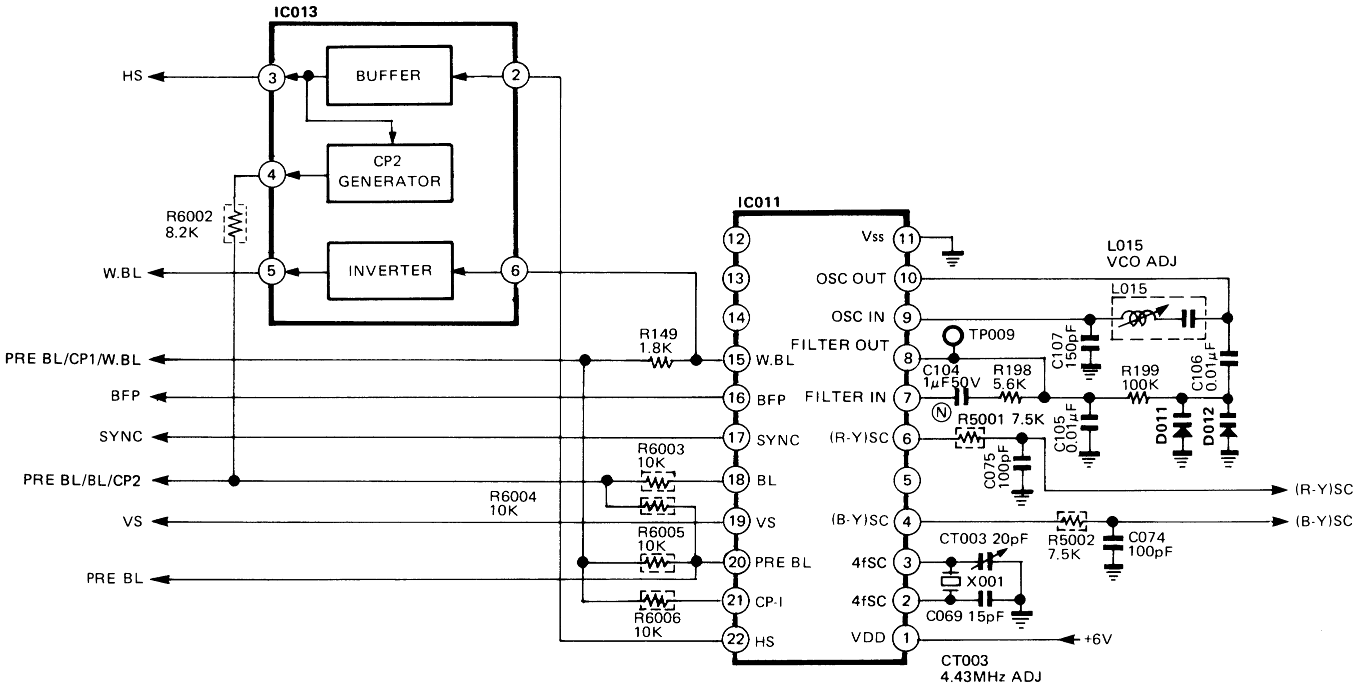

IC013
HS
BUFFER
CP2 GENERATOR
R6002 8.2K
W.BL
INVERTER
PRE BL/CP1/W.BL
BFP
SYNC
PRE BL/BL/CP2
VS
PRE BL
R149 1.8K
R6003 10K
R6004 10K
R6005 10K
R6006 10K
IC011
W.BL
BFP
SYNC
BL
VS
PRE BL
CP-I
HS
Vss
OSC OUT
OSC IN
FILTER OUT
FILTER IN
(R-Y)SC
(B-Y)SC
4fSC
4fSC
VDD
TP009
C104 1μF50V
R198 5.6K
Ⓝ R5001 7.5K
C107 150pF
C105 0.01μF
C075 100pF
L015 VCO ADJ
L015
R199 100K
C106 0.01μF
D011
D012
(R-Y)SC
(B-Y)SC
CT003 20pF
R5002 7.5K
C074 100pF
X001
C069 15pF
+6V
CT003 4.43MHz ADJ

Fig. 4-1-2 Pulse Generator Circuit

CT003 (4.43MHz ADJ) is a control for setting the subcarrier frequency. The (B-Y)SC and (R-Y)SC are supplied to other circuit respectively, through integrators consisting of R5002 and C074, R5001 and C075.
The preblanking (Pre BL) pulse is fed to other circuit.
The Pre BL pulse Ⓐ is mixed with the clamp pulse-1 (CP1) Ⓑ and wide BL pulse (W.BL) Ⓒ through R6005, R6006 and R149. The pre BL pulse Ⓐ is also mixed with the blanking (BL) pulse Ⓔ and the clamp pulse-2 (CP2) Ⓕ comes from pin 4 of IC013. The multiplexed signals Ⓓ and Ⓖ thus made are supplied to other circuit.
The Hs pulse Ⓗ is fed to the Deflection board through pin 3 of IC013 and flat cable JC.
The Hs pulse Ⓗ at pin 2 of IC013 is differentiated inside IC013 and clamp pulse-2 (CP2) Ⓕ is made. The CP2 is mixed with the pre BL pulse Ⓐ and the BL pulse Ⓔ as previously explained.
The vertical scanning start (Vs) pulse is supplied to the Deflection board through flat cable JC. It is also fed to other circuit.
The wide BL (W.BL) pulse is fed to other circuit through IC013.
The burst flag pulse (BFP) is fed to other circuit.

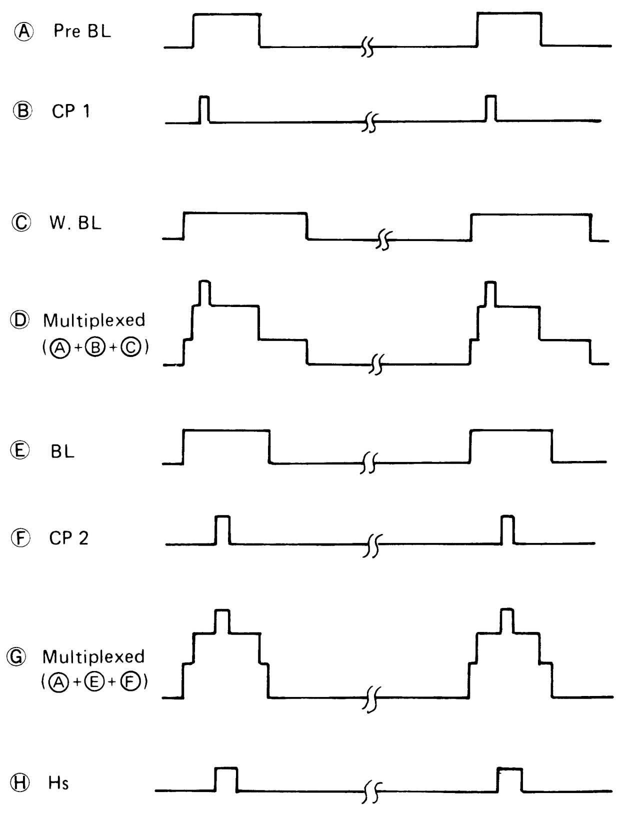

Ⓐ Pre BL
Ⓑ CP 1
Ⓒ W. BL
Ⓓ Multiplexed (Ⓐ+Ⓑ+Ⓒ)
Ⓔ BL
Ⓕ CP 2
Ⓖ Multiplexed (Ⓐ+Ⓔ+Ⓕ)
Ⓗ Hs

Fig. 4-1-3 Mixed Signals

4-2 Signal Processing Circuit

This circuit contains the bias light shading correction circuit, optical black clamp circuit, gamma correction circuit, automatic iris control detection circuit and automatic gain control circuit.

4-2-1 Bias Light Shading Correction Circuit

Outline

The bias light LEDs are located in front of the pick-up tube for minimizing the lag by increasing the light intensity reaches the pick-up tube as described in Deflection board. But the light intensity from the bias light LEDs are not uniform in actual scanning area.

The bias light shading correction circuit equalizes the output of the pick-up tube uniformly.

The horizontal bias light shading correction signal supplied from correction board (YFVPKB0808JA) corrects the horizontal bias light shading. Also the vertical bias light shading correction signal made by VR012 and VR013 on deflection board and OB correction section inside IC001 on process board corrects the vertical bias light shading.

Details

The output signal from preamplifier board (YFVPKA-0802EA) goes to terminal No. 3 of CN002. After it is mixed with the horizontal bias light shading correction signal supplied from correction board through R002, it goes to the amplifier inside IC001 through pin 5. (Refer to Bias light shading correction signal on page 46.)

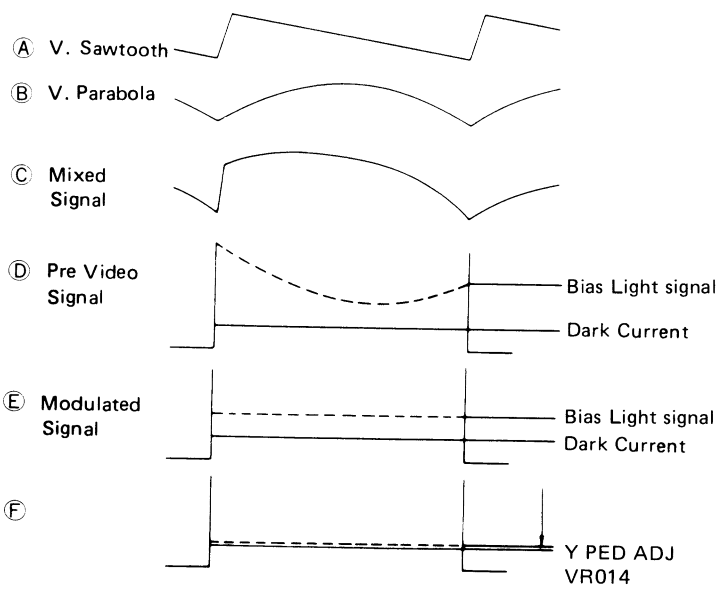


Fig. 4-2-1 Bias Light Shading Correction

The vertical(V) sawtooth Ⓐ and parabola Ⓑ signals are fed to the wiper arms of VR012 (Bs V. SAW) and VR013 (Bs V. PARA) respectively in the Deflection board.

These waveforms are applied from deflection board through flat cable JB to both the non-inverted (pin 3) and inverted (pin 4) inputs of the bias light correction circuit in IC001, where a positive or negative mixed signal Ⓒ of V.sawtooth and parabola signals are made depending on the position of these controls.

VR014 (Y PED) on deflection board controls the positive input potential of the bias light correction circuit to change the DC level of mixed signal Ⓒ in order to cancel the bias light current to zero (real black) level.

The amplified pre-video signal Ⓓ is then modulated by the signal Ⓒ for matching the dark(bias light) current shading (Ⓔ & Ⓕ).

VR012 and VR013 on the deflection board are controls for matching the bias light shading and VR014 is for correcting the difference of dark (bias light) current level.

The corrected pre-video signal is then fed to the clamp circuit in IC001.

4-2-2 Optical Black Clamp Circuit

Outline

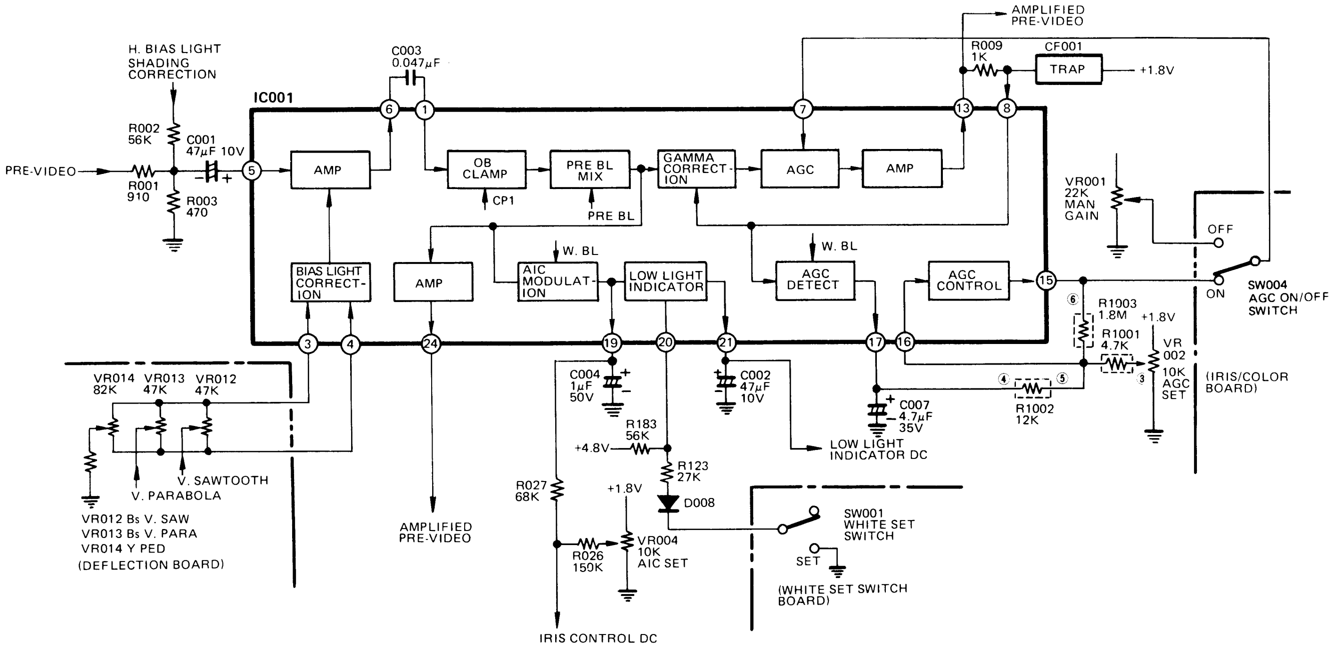
In a color camera using the single carrier frequency multiplexing system, the red(R) and blue(B) signals modulated at 4.3MHz are riding on top of the green(G) signal. Thus the black level of the R and B signals are free from the bias light current variation.

This circuit receives the pre-video signal from the bias light correction circuit and clamps its dark current level for correcting the black level variation.

Details

The pre-video signal which contains the modulated red/blue signals and green signal is fed from the bias light correction circuit to the optical black clamp circuit inside IC001. A metallic strip (optical black) for cutting the incoming light at the end of the horizontal scanning period is built into the pick-up tube faceplate.

When the beam scans the optical black portion Ⓖ , the dark current of the pick-up tube is produced and this signal portion Ⓗ′ is clamped to a fixed DC potential, so that the black level is sensed.



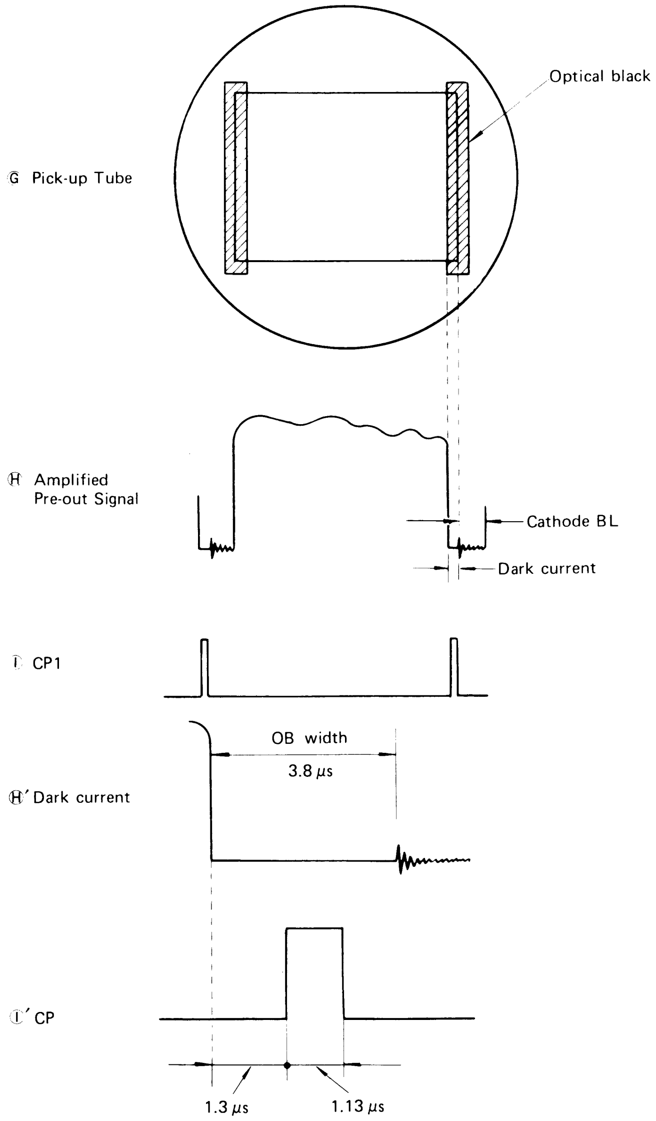
AMPLIFIED PRE-VIDEO
H. BIAS LIGHT SHADING CORRECTION
C003 0.047μF
R009 1K
CF001
TRAP
+1.8V
IC001
R002 56K
C001 47μF 10V
PRE-VIDEO
R001 910
R003 470
AMP
OB CLAMP
CP1
PRE BL MIX
PRE BL
GAMMA CORRECT-ION
AGC
AMP
VR001 22K MAN GAIN
OFF
W. BL
BIAS LIGHT CORRECT-ION
AMP
AIC MODULAT-ION
LOW LIGHT INDICATOR
AGC DETECT
AGC CONTROL
ON
SW004 AGC ON/OFF SWITCH
R1003 1.8M
+1.8V
R1001 4.7K
VR 002 10K AGC SET
(IRIS/COLOR BOARD)
VR014 82K
VR013 47K
VR012 47K
C004 1μF 50V
C002 47μF 10V
R1002 12K
C007 4.7μF 35V
R183 56K
+4.8V
LOW LIGHT INDICATOR DC
R123 27K
V. SAWTOOTH
V. PARABOLA
VR012 Bs V. SAW
VR013 Bs V. PARA
VR014 Y PED
(DEFLECTION BOARD)
R027 68K
+1.8V
D008
AMPLIFIED PRE-VIDEO
SW001 WHITE SET SWITCH
R026 150K
VR004 10K AIC SET
SET
(WHITE SET SWITCH BOARD)
IRIS CONTROL DC

Fig. 4-2-2 Signal Processing Circuit

In other words, the dark current level Ⓗ' of the pre-video signal Ⓗ supplied to the clamp circuit inside IC001 is clamped by the clamp pulse-1 (CP1) Ⓒ separated from the multiplexed signal of CP1, pre BL and wide BL pulses inside IC001. (The multiplexed signal of CP1, pre BL and wide BL pulses are generated in the pulse generator circuit, mixed and then fed to the pulse separator where they are separated.)

The clamped video signal is mixed with the pre BL pulse from the pulse separator and the noise during the blanking period is removed.

The mixed signal is then fed to the gamma correction circuit, automatic iris control detection circuit and tracking signal generator inside IC003 through amplifier in IC001.



Optical black
Ⓖ Pick-up Tube
Ⓗ Amplified Pre-out Signal
Cathode BL
Dark current
Ⓘ CP1
OB width
3.8 μs
Ⓗ' Dark current
Ⓘ' CP
1.3 μs
1.13 μs

Fig. 4-2-3 OB Clamp

4-2-3 Gamma Correction Circuit

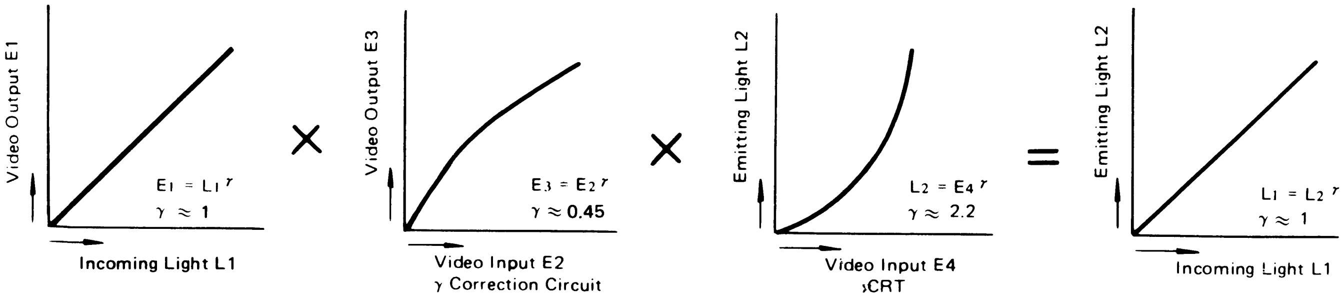


Fig. 4-2-4 Gamma Correction

Outline

This circuit corrects the non-linear photoelectric conversion characteristic of cathode ray tube (CRT) and reproduces a linear picture of high fidelity on the monitor.

In order for a televised picture to have the same contrast gradation as the original scene, the system (including the pick-up tube, signal processing inside camera and monitor, and CRT) gamma must be equal to 1.

The gamma characteristic of pick-up tube (SATICON®) is approx. 1.0 and the gamma characteristic of the monitor CRT is approx. 2.2, so that the gamma characteristic of the gamma correction circuit should be approx. 0.45, which makes the total gamma to be approx. 1.0 as shown in Fig. 4-2-4.

Details

The pre-video signal is fed to the gamma(r) correction circuit and undergoes the gamma correction.

Since the modulated red(R) and blue(B) signals are ridden on the green(G) signal, the negative feedback gamma correction circuit is adapted.

4-2-4 Automatic Iris Control Detection Circuit

Outline

This circuit detects the DC voltage corresponding to the light intensity and sends this DC voltage to the automatic iris control drive circuit in the Micro processor board.

Details

The wide BL (W.BL) pulse Ⓠ separated from CP1/pre BL/W.BL mixed signal is supplied to the AIC modulation circuit inside IC001 from the pulse separator. The pre-video signal Ⓡ is fed from the pre BL mix circuit to the modulation circuit, where the pre-video signal Ⓡ is modulated by the W.BL pulse Ⓠ .

The modulated pre-video signal Ⓢ is peak-rectified in the modulation circuit and converted into DC voltage corresponding to the pre-video level i.e., the incoming light intensity. This DC voltage is fed through pin 19 of IC001 and terminal No. 2 of CN003 to the automatic iris control circuit in the Micro processor board together with the DC voltage set by VR004 (AIC SET) which sets the normal iris stop at the standard light intensity. The DC voltage is also supplied to the low light indicator circuit in IC001.

When the camera is operated in the normally illuminated scene, the output from the low light indicator at pin 21 of IC001 is high level. However, when the camera is aimed at the weakly illuminated scene, the output becomes low level and it is sent to the Micro processor board for displaying the graphics (LIGHT).

When the white set switch SW001 is set to the SET position, the cathode of D008 is grounded and the voltage at pin 20 of IC001 decreases to keep the voltage at pin 21 high level.

In this way the graphics(LIGHT) are not displayed on the viewfinder while the automatic white balance is being set.

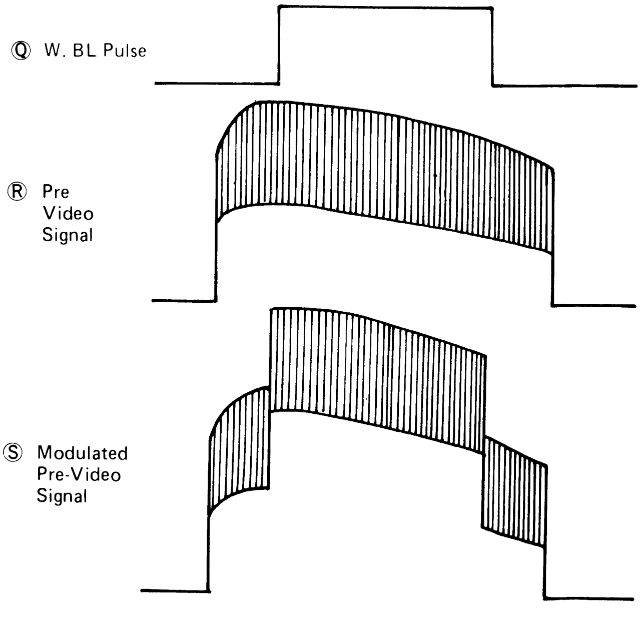


Fig. 4-2-5 AIC Detection

4-2-5 Automatic Gain Control Circuit

Outline

This circuit amplifies the preamplifier output signal. The amplified signal level is maintained constant by automatically controlling the gain of the amplifier. The gain of the amplifier starts to vary only when the lens iris is fully opened.

Details

The pre-video signal from the gamma correction circuit in IC001 is fed through the AGC amplifier and amplifier to trap CF001 which removes the 4.3MHz modulated component and the luminance (Y) signal is obtained. The Y signal is then applied to the AGC detect circuit where the Y signal Ⓣ is modulated by the wide BL pulse Ⓤ from the pulse separator and the modulated Y signal Ⓥ is made for detecting signal level corresponding to the center image. The modulated Y signal Ⓥ is peak-rectified in the AGC detect circuit and converted into DC voltage corresponding to the Y signal level i.e., the incoming light intensity. This DC voltage is then fed through pins 17 and 16 of IC001 to the AGC control circuit where it is compared with the reference DC voltage. The error between the DC voltages is fed through the AGC ON/OFF switch SW004 to the AGC amplifier to control its gain.

When the camera is used in the normally illuminated scene, the signal level is maintained constant by automatically adjusting the lens iris. Therefore the gain of AGC amplifier does not change. However, when the camera is aimed at the weakly illuminated scene and lens iris becomes wide open, the Y signal level is decreased. The decreased Y signal level is detected by the AGC detection circuit and converted into the DC voltage. This DC voltage is fed through the AGC control circuit and the AGC ON/OFF switch SW004 through CN005 to the AGC amplifier to control the gain of amplifier. In this way the signal level corresponding to normal and relatively high illumination is kept constant by the lens iris opening, and the signal level corresponding to relatively low illumination is controlled by the AGC circuit.

The gain controlled pre-video signal which has the modulated red and blue signal at pin 13 of IC001 is supplied to the luminance signal processing circuit and red and blue separation circuit.

VR002 (AGC SET) sets the gain of the amplifier in the automatic gain control mode.

VR001 (MAN GAIN) set the gain of the amplifier in the manual gain control mode.

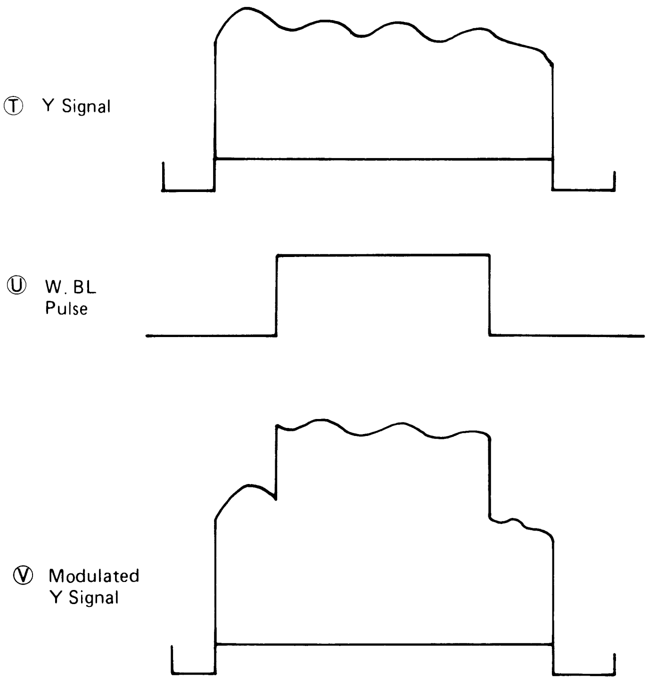


Fig. 4-2-6 AGC Detection

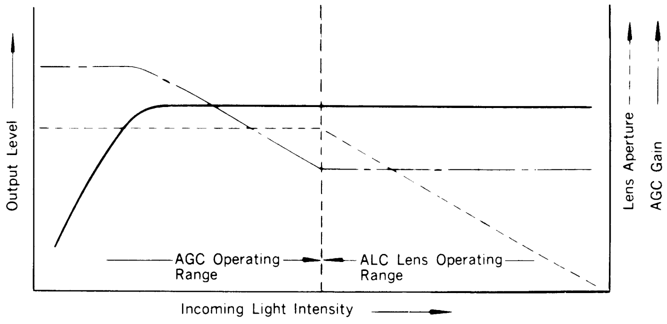


Fig. 4-2-7 AGC Operation

4-3 Luminance Signal Processing Circuit

This circuit consists of YH signal circuit, YL signal circuit and Y(edge) signal circuit.

4-3-1 Y_H Signal Circuit

Outline

This circuit receives the amplified pre-video signal from the automatic gain control circuit and generates the luminance (YH) signal having high frequency response characteristic.

Details

The amplified pre-video signal is fed from the AGC circuit through pin 13 of IC001 to trap CF001 which removes the 4.3MHz modulated component and luminance (Y) signal is obtained. The Y signal at pin 8 of IC001 is fed to the YH white suppress circuit, where the high level of Y signal is slightly suppressed. The suppressed Y signal is then supplied to 3.5MHz low pass filter CF002, where the frequency response of Y signal is limited to 3.5MHz, and the YH signal having high frequency response characteristic is generated.
The YH signal is then mixed with the vertical edge signal supplied from the vertical edge signal generator circuit. After its level is set by VR003 (Y GAIN), the YH signal is supplied to the horizontal aperture signal generator circuit in IC002.

4-3-2 Y_L Signal Circuit

Outline

This circuit receives the amplified pre-video signal from the automatic gain control circuit and generates the luminance (YL) signal having low frequency response characteristic.

Details

The amplified pre-video signal is fed from the AGC circuit through pin 13 of IC001 to 0.5MHz low pass filter CF005, where the 4.3MHz modulated component is removed and the luminance (YL) signal which frequency response is limited to 0.5MHz is obtained. The YL signal Ⓐ thus made is fed to the YL pedestal circuit inside IC002, where YL signal Ⓐ is mixed with the pre BL pulse Ⓑ and the mixed signal Ⓒ is made. The mixed signals low level pre BL portion is clipped and its pedestal level is set Ⓓ . The clip level (pedestal level) is set by VR005 (YL PED).
The YL signal whose pedestal level is set is supplied through pin 17 of IC002 and pin 13 of IC005 to the R-YL/B-YL signal circuit in the red and blue separation & Chroma processing circuit.

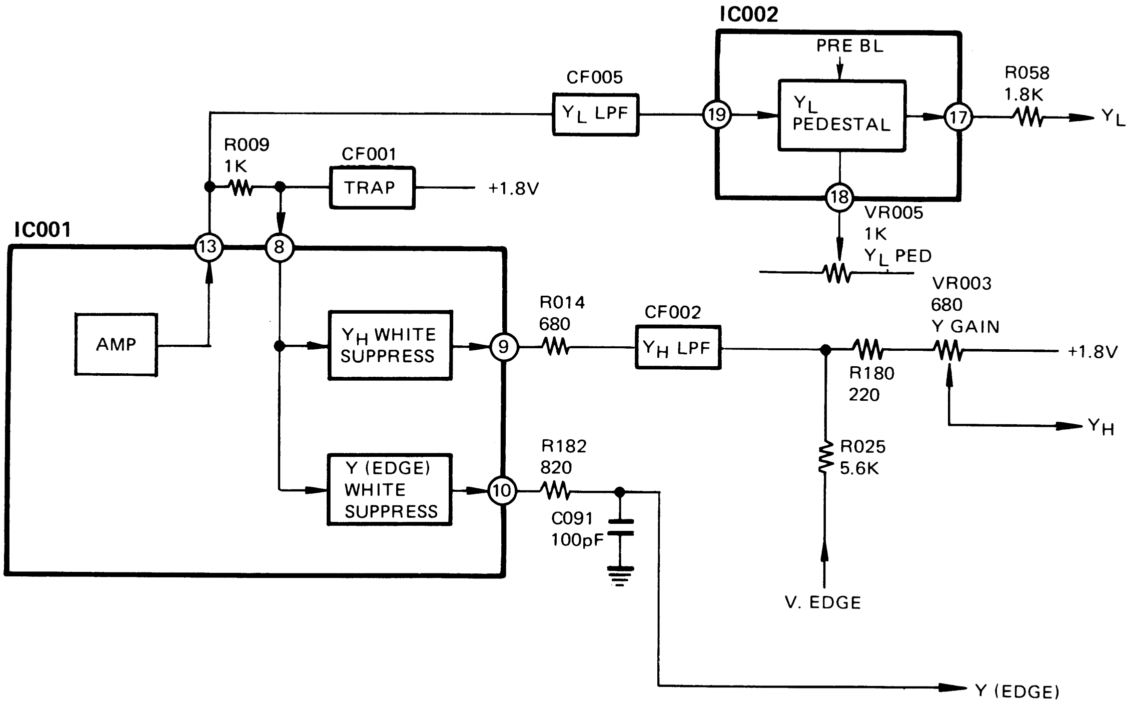

IC002
PRE BL
CF005
Y_L LPF
19
Y_L PEDESTAL
17
R058
1.8K
Y_L
R009
1K
CF001
TRAP
+1.8V
18
VR005
1K
Y_L PED
IC001
13
8
VR003
680
Y GAIN
AMP
Y_H WHITE SUPPRESS
9
R014
680
CF002
Y_H LPF
+1.8V
R180
220
Y_H
R182
820
R025
5.6K
Y (EDGE) WHITE SUPPRESS
10
C091
100pF
V. EDGE
Y (EDGE)

Fig. 4-3-1 Luminance Signal Processing Circuit

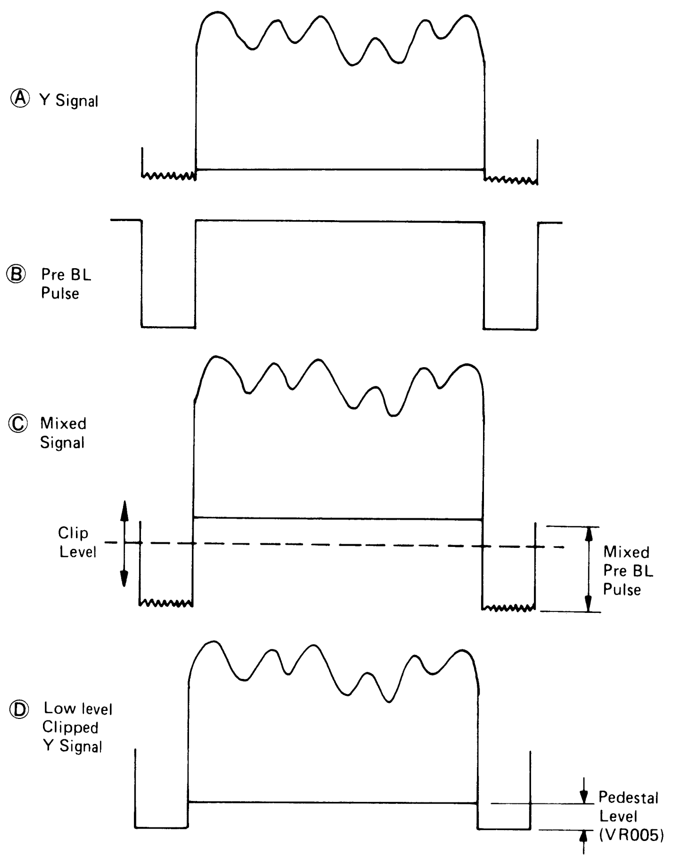

Ⓐ Y Signal
Ⓑ Pre BL Pulse
Ⓒ Mixed Signal
Clip Level
Mixed Pre BL Pulse
Ⓓ Low level Clipped Y Signal
Pedestal Level (VR005)

Fig. 4-3-2 YL Pedestal Setting

4-3-3 Y(edge) Signal Circuit

Outline

This circuit generates the luminance (Y(edge)) signal for making the vertical edge signal.

Details

The Y signal obtained by removing the 4.3MHz from the pre-video signal with trap CF001 is supplied to the Y(edge) white suppress circuit inside IC001, where the high level of Y signal is suppressed and the luminance (Y(edge)) signal for making the vertical edge signal is obtained. This signal is fed through pin 10 of IC001 to the vertical edge signal generator circuit.

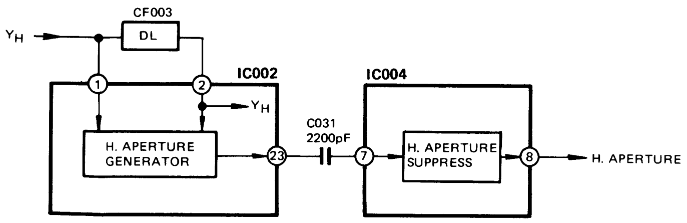

YH
CF003
DL
IC002
IC004
1
2
YH
C031
2200pF
H. APERTURE GENERATOR
23
7
H. APERTURE SUPPRESS
8
H. APERTURE

Fig. 4-4-3 H. Aperture Signal Generator Circuit

4-4 Horizontal Aperture Signal Generator Circuit

Outline

This circuit generates the horizontal(H) edge (aperture) signal to enhance the horizontal resolution.

Details

The luminance (YH) signal having high frequency response is fed from the YH signal circuit to the H.aperture generator circuit.

When the camera is aimed at an object Ⓐ for example, the signal Ⓑ passed through pin 1 of IC002, signal Ⓒ delayed 0.15 μs by delay line CF003 and amplified in the H.aperture generator circuit and signal Ⓓ which results from the delayed YH signal being reflected back through CF003 and delayed again (0.3 μs) appear at the output of the H.aperture generator circuit where they are mixed in fixed proportions to make up the H.aperture signal Ⓔ.

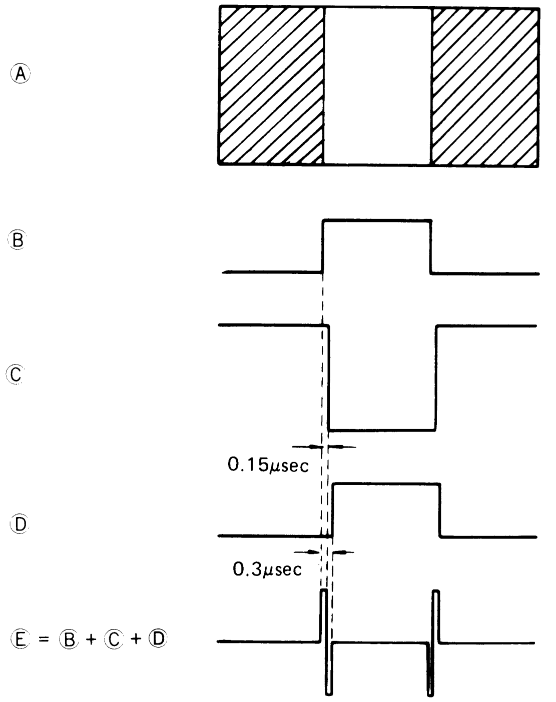

Ⓐ
Ⓑ
Ⓒ
0.15μsec
Ⓓ
0.3μsec
Ⓔ = Ⓑ + Ⓒ + Ⓓ

Fig. 4-4-1 Horizontal Aperture Signal

The H.aperture signal which undergoes the noise coring is then supplied through pin 8 of IC004 to the Y/chroma/aperture mix circuit, where it is mixed with the luminance and chrominance signal.

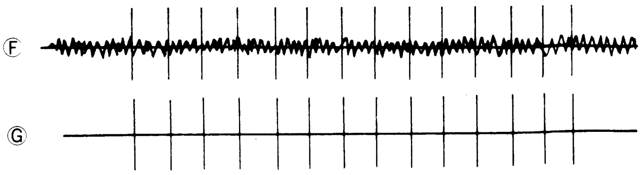


Fig. 4-4-2 H. Aperture Noise Coring

The H.aperture signal obtained in this way is applied through pin 23 of IC002 and pin 7 of IC004 to the H.aperture noise suppress/coring circuit, where the noise mixed in the H.aperture signal Ⓕ is removed (Ⓖ).

4-5 Vertical Edge Signal Generator Circuit

Outline

This circuit generates a vertical edge signal for increasing the vertical resolution by enhancing vertical edge contrast.

Details

The luminance (Y(edge)) signal Ⓐ , for making the vertical(V) edge signal, supplied from the Y(edge) signal circuit is fed to the Y(edge) modulator in IC006 through pin 5. In the Y(edge) modulator, the Y(edge) signal modulates the subcarrier signal which is applied from the pulse generator circuit through pin 6. The modulated signal is sent to the glass delay line DL003 which delays the input signal by 1 horizontal (H) line. The 1H delayed modulated signal is supplied to the full-wave detector circuit in IC006 through VR013 (V.EDGE BALANCE). The detected 1H delayed Y(edge) signal Ⓑ is fed to the differential amplifier in IC006, where it is mixed with the undelayed Y(edge) signal Ⓐ applied through pin 5 of IC006 to form a vertical edge signal Ⓒ . The vertical edge signal from pin 2 of IC006 is sent to the low pass filter CF008 where the 4.43MHz and its harmonics are removed. The vertical edge signal from the low pass filter is fed to the V.edge amplifier in IC003 through pin 4. The amplified V.edge signal is fed to the detection circuit in IC003, where the positive V.edge signal Ⓓ is generated. This signal is sent to the PAL signal processing circuit through R047.

The V.edge signal Ⓓ is fed to the mixing circuit in IC003, where it is mixed with the amplified V.edge and V.edge signal Ⓔ is made. The V.edge signal Ⓔ is sent to the vertical transient spurious correction circuit inside IC003 through pin 9, and to the YH signal circuit where it is mixed with the YH signal through R025.

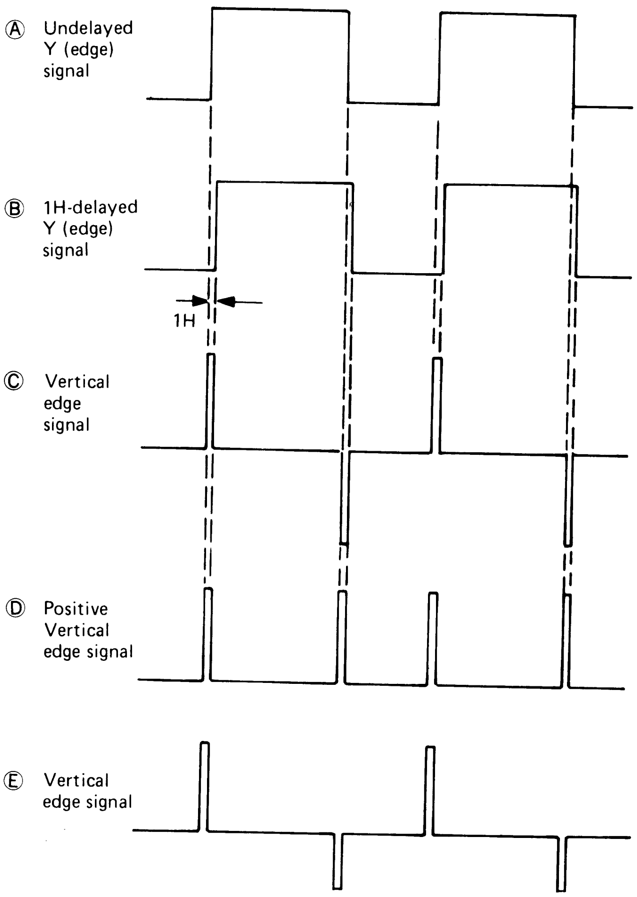

Ⓐ Undelayed Y (edge) signal
Ⓑ 1H-delayed Y (edge) signal
1H
Ⓒ Vertical edge signal
Ⓓ Positive Vertical edge signal
Ⓔ Vertical edge signal

Fig. 4-5-1 Vertical Edge Signal

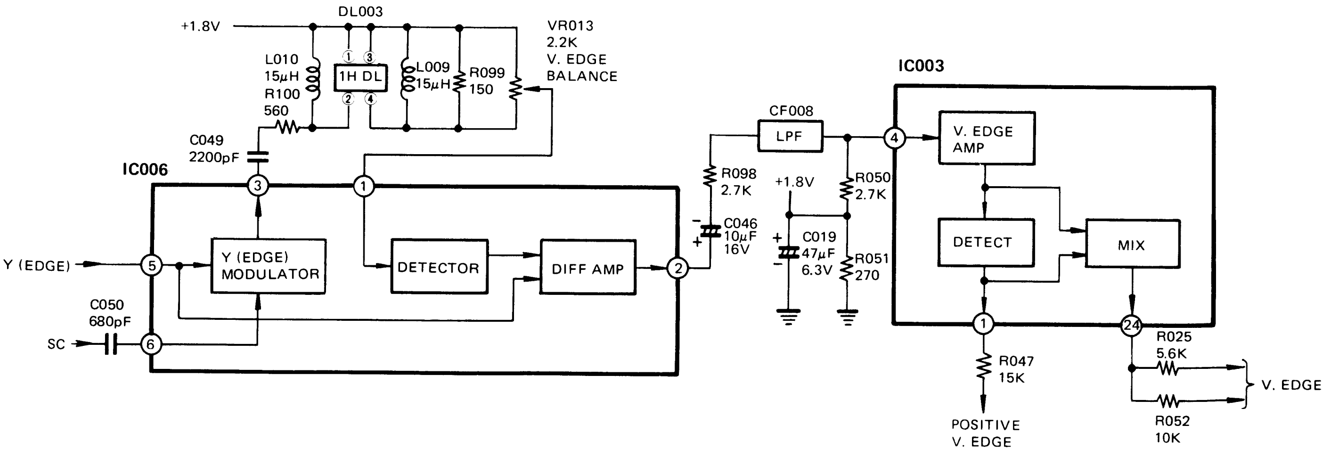

DL003
+1.8V
VR013
2.2K
V. EDGE
BALANCE
L010
15μH
R100
560
1H DL
1 3
2 4
L009
15μH
R099
150
C049
2200pF
IC006
3
1
Y (EDGE)
5
Y (EDGE)
MODULATOR
DETECTOR
DIFF AMP
2
C050
680pF
SC
6
CF008
LPF
R098
2.7K
+1.8V
C046
10μF
16V
C019
47μF
6.3V
R050
2.7K
R051
270
IC003
4
V. EDGE
AMP
DETECT
MIX
1
24
R047
15K
POSITIVE
V. EDGE
R025
5.6K
R052
10K
V. EDGE

Fig. 4-5-2 V. Edge Signal Generator Circuit

4-6 Red and Blue Separation & Chroma Processing Circuit

This circuit consists of the red and blue separation circuit, the vertical transient spurious correction circuit, the shading correction circuit, the tracking correction circuit, the R-YL signal circuit, the B-YL signal circuit and the chroma clip signal circuit.

4-6-1 Red and Blue Separation Circuit

Outline

This circuit takes out the modulated red(Rc) and blue (Bc) signals from the combined preamplifier output signal which is composed of a green(G) signal mixed with 4.3MHz modulated red(Rc) and blue(Bc) signal.

Details

The amplified pre-video signal Ⓐ obtained at pin 13 of IC001 is fed to 4.3MHz band pass filter (BPF) CF006 where the Rc/Bc signal Ⓑ is detected. The detected Rc/Bc signal is then supplied through VR007 (Rc/Bc GAIN) to the R/B gain control circuit through pin 13 of IC003.

When the lens iris becomes wide open, the modulation depth of red and blue signals decreases.

It is compensated by controlling the gain of the R/B gain control circuit with the DC voltage corresponding to the lens iris opening. This DC voltage is fed from the lens to the R/B gain control circuit through terminal No. 3 of CN003, D005 and pin 14 of IC003.

The gain controlled Rc/Bc signal is then supplied to the 90° phase shifter through pre BL mix circuit where the noise on the blanking period is removed. The 90° phase-shifted Rc/Bc signal Ⓒ obtained at pin 11 of IC003 is applied to the R/B separation circuit inside IC005 through pin 2. CT001 (Rc/Bc SEPARATION-1) is a control for shifting the phase of Rc/Bc signal by 90°.

The Rc/Bc signal Ⓑ at pin 6 of IC003 is supplied to 1H delav line DL001 where it is delayed one horizontal line (64 μsec). 1H delayed Rc/Bc signal is then sent to the vertical transient spurious correction circuit inside IC003 through VR006 (Rc/Bc SEPARATION-2) and pin 18. (The vertical transient spurious correction circuit will be described later.)

The Rc/Bc signal Ⓓ undergoes the vertical transient spurious correction and inverted in the correction circuit is applied from pin 7 of IC003 to the R/B separation circuit inside IC005 through pin 24.

In the R/B separation circuit, the 90° phase-shifted Rc/Bc signal Ⓒ and the inverted 1H-delayed Rc/Bc signal Ⓓ are added forming the Rc signal Ⓔ, and the Rc/Bc signal Ⓒ and the Rc/Bc signal Ⓓ are subtracted each other forming the Bc signal Ⓕ.

The Rc and Bc signals thus separated are fed to the respective shading/tracking correction circuits.

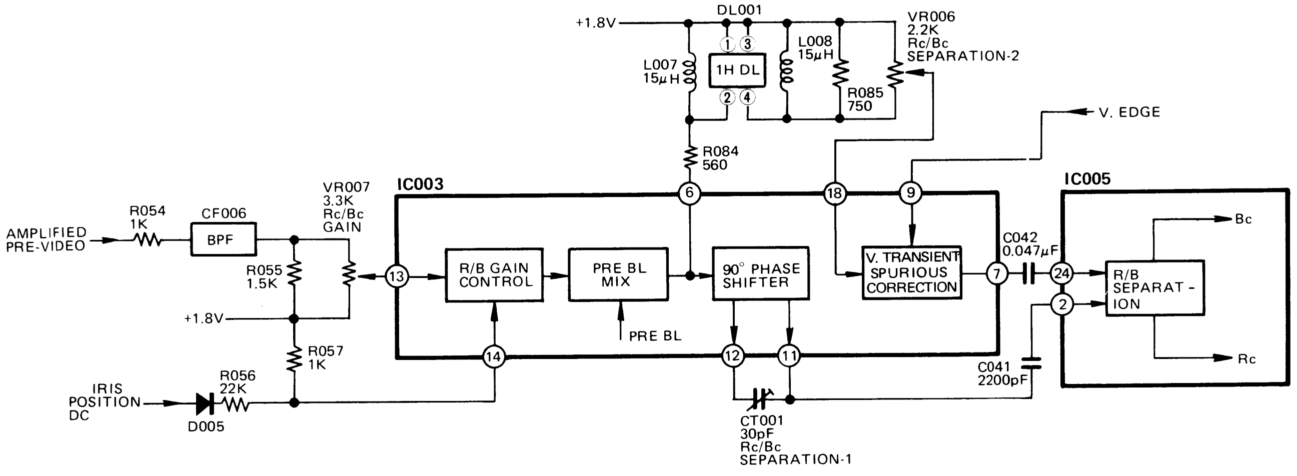

+1.8V
DL001
1H DL
L007 15μH
L008 15μH
R085 750
VR006 2.2K Rc/Bc SEPARATION-2
V. EDGE
R084 560
IC003
IC005
AMPLIFIED PRE-VIDEO
R054 1K
CF006
BPF
VR007 3.3K Rc/Bc GAIN
R055 1.5K
R057 1K
R056 22K
IRIS POSITION DC
D005
R/B GAIN CONTROL
PRE BL MIX
PRE BL
90° PHASE SHIFTER
V. TRANSIENT SPURIOUS CORRECTION
C042 0.047μF
C041 2200pF
CT001 30pF Rc/Bc SEPARATION-1
R/B SEPARAT-ION
Bc
Rc

Fig. 4-6-1 Red and Blue Separetion Circuit

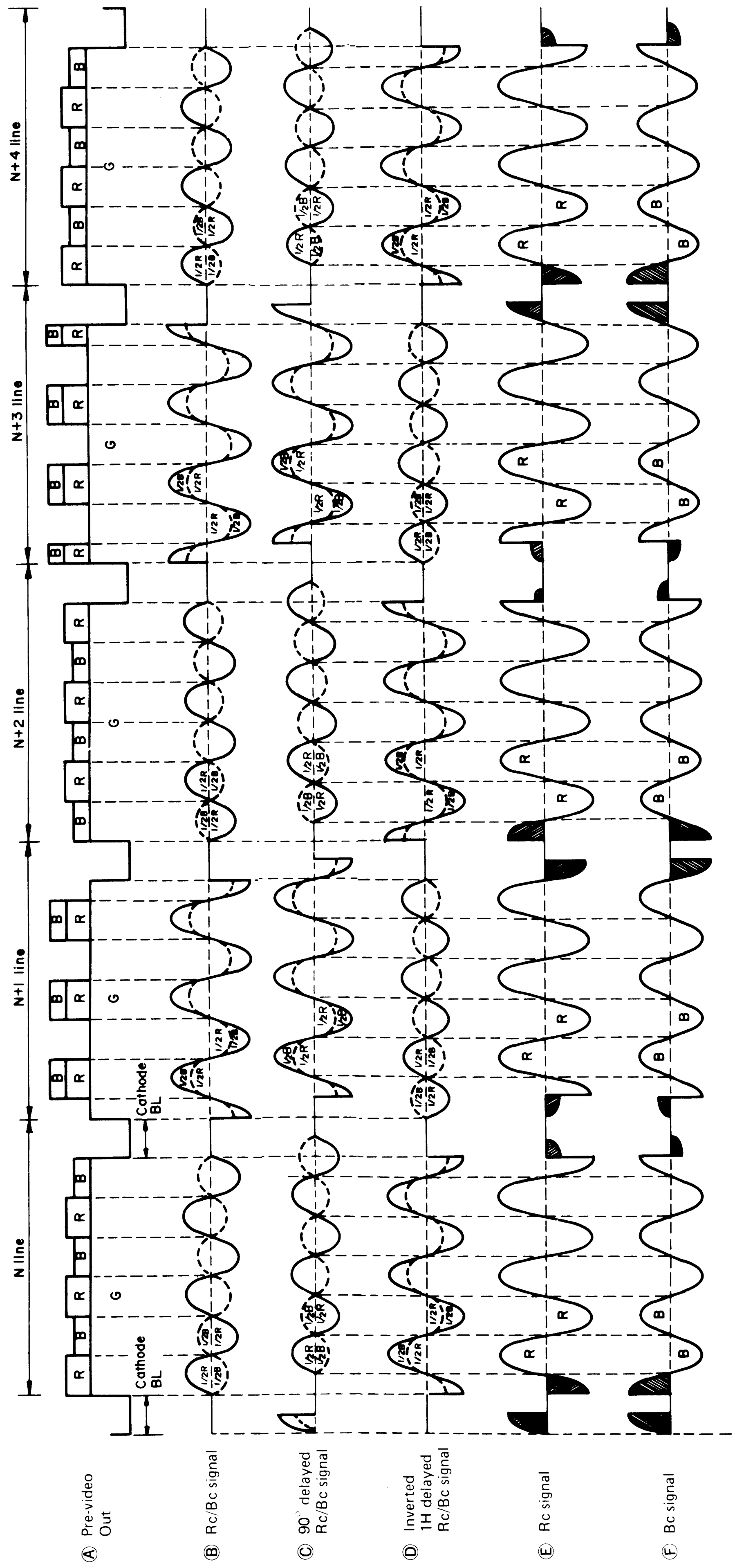

N line
N+1 line
N+2 line
N+3 line
N+4 line
Cathode BL
R
B
G
1/2R
1/2B
Ⓐ Pre-video Out
Ⓑ Rc/Bc signal
Ⓒ 90° delayed Rc/Bc signal
Ⓓ Inverted 1H delayed Rc/Bc signal
Ⓔ Rc signal
Ⓕ Bc signal

Fig. 4-6-2 Rc/Bc Signal Separation

4-6-2 Vertical Transient Spurious Correction Circuit

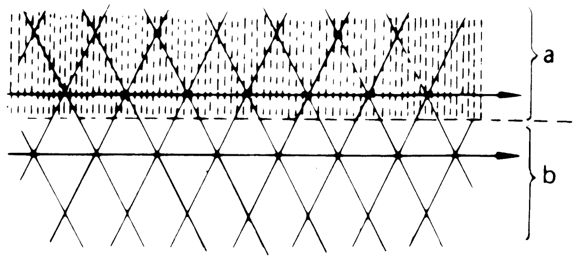
Outline

As described previously in 4-6-1 red and blue separation circuit, the Rc and Bc signals are separated from each other by addition and subtraction of the one line(1H) delayed Rc/Bc signal and the phase-shifted Rc/Bc signals but not delayed.

When a pattern such as shown below is seen by the camera, the Rc/Bc signal which is not delayed appears as in Ⓘ, and the Rc/Bc signal delayed one line(1H) becomes as in Ⓙ.

Therefore, it is impossible to secure vertical correlation between Rc/Bc signals of N+1 line, and a " spurious signal " differing in level of Rc and Bc signals against Y signal Ⓗ is generated, and the vertical(V) edge of the object is unnaturally colored by this "spurious signal".

The vertical transient spurious correction circuit controls the amplitude of 1H-delayed Rc/Bc signal Ⓙ corresponding to the N+1 line with vertical(V) edge signal Ⓚ and the signal Ⓛ is made. This provides vertical correlation between Rc/Bc signals Ⓘ and Ⓛ prior to color separation.



a : Dark object
b : Bright object

Fig. 4-6-3

Details

The vertical edge signal Ⓚ in Fig. 4-6-4 is sent from the vertical edge signal generator circuit to the vertical transient spurious correction circuit inside IC003 through pin 9 of IC003. In this circuit, those parts of the 1H-delayed Rc/Bc signal Ⓙ which do not correlate with the Rc/Bc signal Ⓘ (not 1H-delayed) are controlled in level by the vertical edge signal Ⓚ. The corrected Rc/Bc signal Ⓛ is fed to the R/B separation circuit inside IC005 through pin 7 of IC003 and pin 24 of IC005.

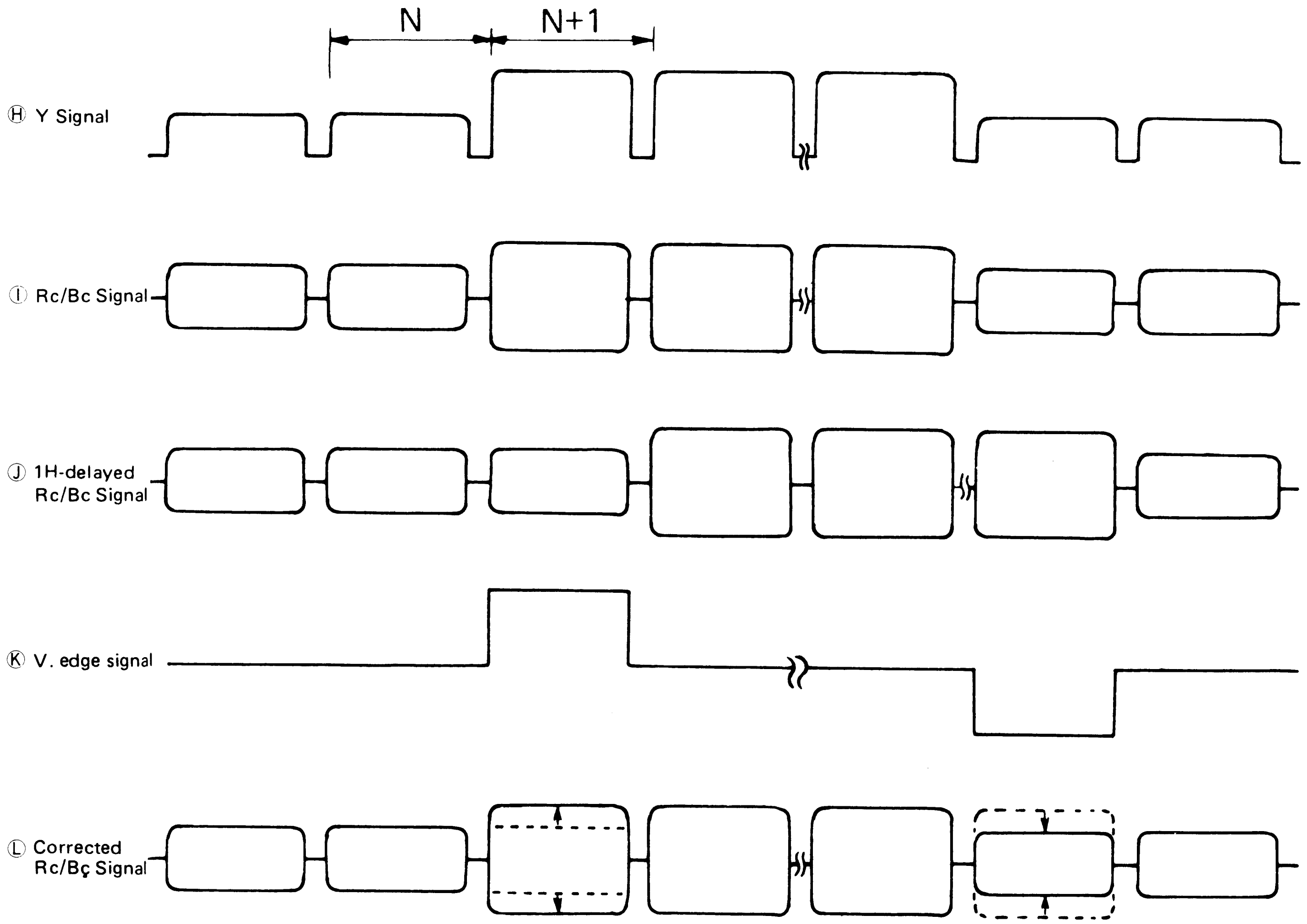


Fig. 4-6-4 Vertical Transient Spurious Correction

4-6-3 Shading Correction Circuit

Outline

Even when dynamic focus is applied to grid-4(G4) of pick-up tube, the non-uniformity of modulation due to uneven focus on the target can not be completely eliminated.

Modulation non-uniformity also occurs due to non-uniform structure in the photoconductive layer of the pick-up tube (manufacture tolerance).

The shading correction circuit compensates for residual picture shading using horizontal(H) and vertical(V) sawtooth and parabola signals supplied from the correction board.

Details

- **Red shading correction**

The red shading correction signal from the correction board is supplied to the red shading/tracking correction circuit inside IC005 through pin 22.

Suppose a uniformly illuminated white object is seen by the camera and the Rc signal has a shading (unevenness of amplitude) such as that shown in Fig. 4-6-5 Ⓜ. This is sent to the shading/tracking correction circuit from the Rc/Bc separation circuit inside IC005. In this case, the shading correction signal Ⓝ is fed from the correction board and it is applied to the correction circuit. In this case, the four red shading controls are adjusted to generate the shading correction signal Ⓝ. The Rc signal Ⓜ is modulated by the shading correction signal Ⓝ and the corrected signal Ⓞ is produced. The shading correction signal mixed with the Rc signal Ⓞ is removed in the correction circuit and the Rc signal Ⓟ is obtained. In this way, the shading of the Rc signal is corrected. The corrected Rc signal is then fed to the R-YL signal circuit inside IC005.

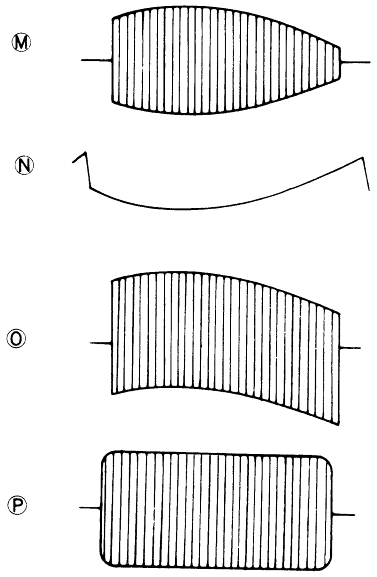


Fig. 4-6-5 Shading Correction

- **Blue shading correction**

As in the case of red shading correction, the horizontal shading correction signal and the vertical shading correction signal are mixed and fed to the shading/tracking correction circuit inside IC005 through pin 3, where it modulates the modulated blue(Bc) signal (supplied from the R/B separation circuit) for the shading correction. The shading-corrected Bc signal is then applied to the B-YL signal circuit inside IC005.

4-6-4 Tracking Correction Circuit

Outline

In this color camera, the red(R) and blue(B) signals modulated at 4.3MHz (high frequency component) are riding on top of the green(G) signal (low frequency component) when they are extracted from the pick-up tube.

The photoelectric conversion characteristic of the pick-up tube is different between the high frequency component and low frequency component.

The modulation depth of Rc and Bc signals corresponding to the weakly illuminated scene is reduced due to the over-beam in the pick-up tube.

As a result, the R and B signals obtained by detecting the Rc and Bc signals do not track with the YL signal.

This circuit generates the tracking signals for correcting the characteristic of the R and B signals, and tracks them with the YL signal.

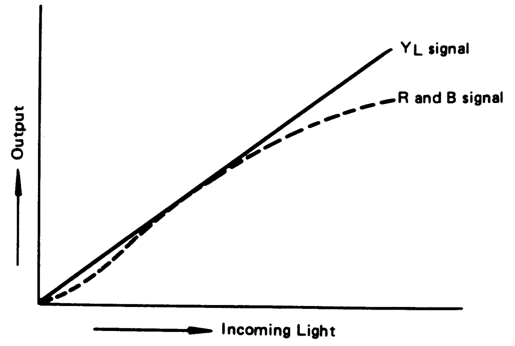


Fig. 4-6-6 Mistracking of YL and R/B Signal

Details

The amplified pre-video signal Ⓠ (which contains the modulated red and blue signals as well as the green signal) obtained at pin 24 of IC001 is fed to the low pass filter consisting of L101 and C001, where the 4.3MHz modulated component is removed and a luminance (Y) signal Ⓡ is made.

The Y signal Ⓡ is fed through pin 19 to the tracking signal generator inside IC003 where a tracking-1 signal Ⓢ, a tracking-2 signal Ⓣ and a tracking-3 signal Ⓤ are generated respectively.

The tracking-1 signal Ⓢ at pin 16 of IC003 is supplied to VR012 (B. TRACKING-1) and VR016 (R. TRACKING-1) for correcting the relatively low level of R and B signals.

The tracking-2 signal Ⓣ at pin 17 of IC003 is fed to VR011 (B. TRACKING-2) and VR014 (R. TRACKING-2) for correcting the relatively higher portion of R and B signals.

The tracking-3 signal Ⓤ at pin 15 of IC003 is sent to VR010 (B. TRACKING-3) and VR015 (R. TRACKING-3) for correcting the high level of R and B signals.

These tracking correction signals are supplied through the tracking controls to the R. shading/tracking correction circuit and B. shading/tracking correction circuit inside IC005, where they modulates the Rc and Bc signals Ⓥ come from the R/B separation circuit for correcting the linearity of Rc and Bc signal Ⓦ. In this way, the R and B signals match the YL signal.

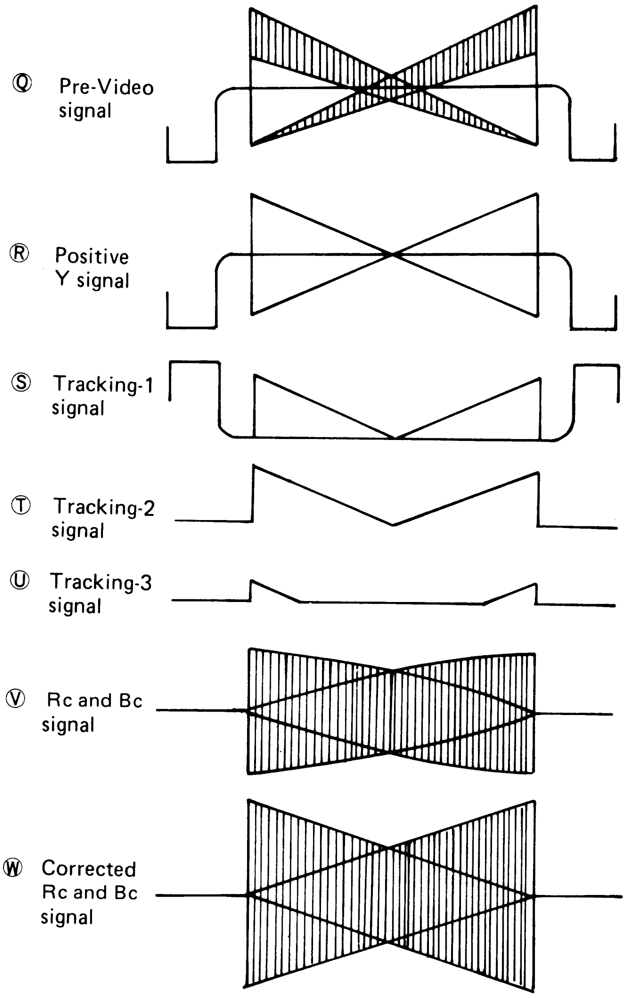

Ⓠ Pre-Video signal
Ⓡ Positive Y signal
Ⓢ Tracking-1 signal
Ⓣ Tracking-2 signal
Ⓤ Tracking-3 signal
Ⓥ Rc and Bc signal
Ⓦ Corrected Rc and Bc signal

Fig. 4-6-7 Tracking Correction-1

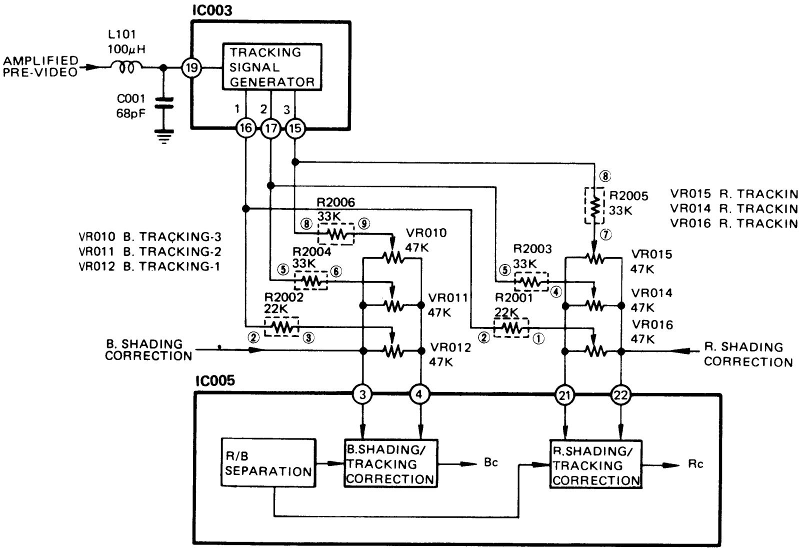

IC003
L101
100μH
AMPLIFIED PRE-VIDEO
C001
68pF
TRACKING SIGNAL GENERATOR
1
2
3
19
16
17
15
⑧
R2005
33K
⑦
VR015 R. TRACKING-3
VR014 R. TRACKING-2
VR016 R. TRACKING-1
R2006
33K
⑧ ⑨
VR010 B. TRACKING-3
VR011 B. TRACKING-2
VR012 B. TRACKING-1
R2004
33K
⑤ ⑥
VR010
47K
R2003
33K
⑤
VR015
47K
R2002
22K
VR011
47K
R2001
22K
④
VR014
47K
② ③
② ①
VR016
47K
B. SHADING CORRECTION
VR012
47K
R. SHADING CORRECTION
IC005
3
4
21
22
R/B SEPARATION
B.SHADING/ TRACKING CORRECTION
Bc
R.SHADING/ TRACKING CORRECTION
Rc

Fig. 4-6-9 Tracking Correction Circuit

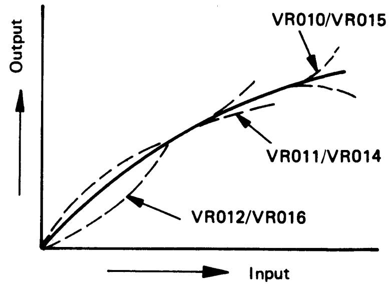


Fig. 4-6-8 Tracking Correction-2

4-6-5 R-YL Signal Circuit

Outline

This circuit receives the modulated red(Rc) signal from the red shading/tracking correction circuit and detects the red signal. The detected red signal and the YL signal supplied from the YL signal circuit make the R-YL color difference signal. The R-YL signal is fed to the chroma encoding circuit.

Details

The Rc signal Ⓐ from the red shading/tracking correction circuit is fed to the gain control circuit whose gain is controlled for the automatic white balancing. The gain controlled Rc signal is sent to the amplifier through the pre BL mixing circuit where the noise during the blanking period of Rc signal is removed. The positive Rc signal Ⓑ and negative Rc signal Ⓒ are obtained at the output of amplifier and they are forwarded to the detector. The detected R signal Ⓓ is then fed to the R-YL amplifier. The YL signal from the YL signal circuit is also supplied to the R-YL amplifier where the R-YL color difference signal is made up. The R-YL signal is sent to the low pass filter. The detector which extracts the red signal produces a unwanted 8.6MHz ripple signal Ⓓ . The 8.6MHz component is removed by the low pass filter and leaving only the red signal Ⓔ.

The frequency response of red signal and YL signal also become same by the low pass filter.

The resultant R-YL signal from pin 14 of IC005 is fed through IC012 to the chroma encoding circuit through pin 3 of IC004.

VR002 (COLOR ADJUST) which is located on the side of camera is a control for fine adjustment of the color balance. VR017 (R. GAIN) is a presetting control for the red signal level. VR018 (R. PED) is a control for setting the red pedestal.

SW001 on the process board is a YL ON/OFF switch for disconnecting the YL signal.

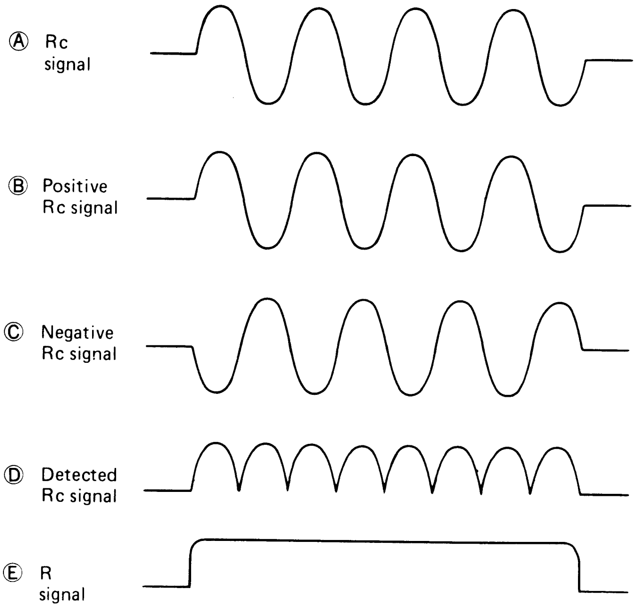

Ⓐ Rc signal
Ⓑ Positive Rc signal
Ⓒ Negative Rc signal
Ⓓ Detected Rc signal
Ⓔ R signal

Fig. 4-6-10 Red Signal Detection

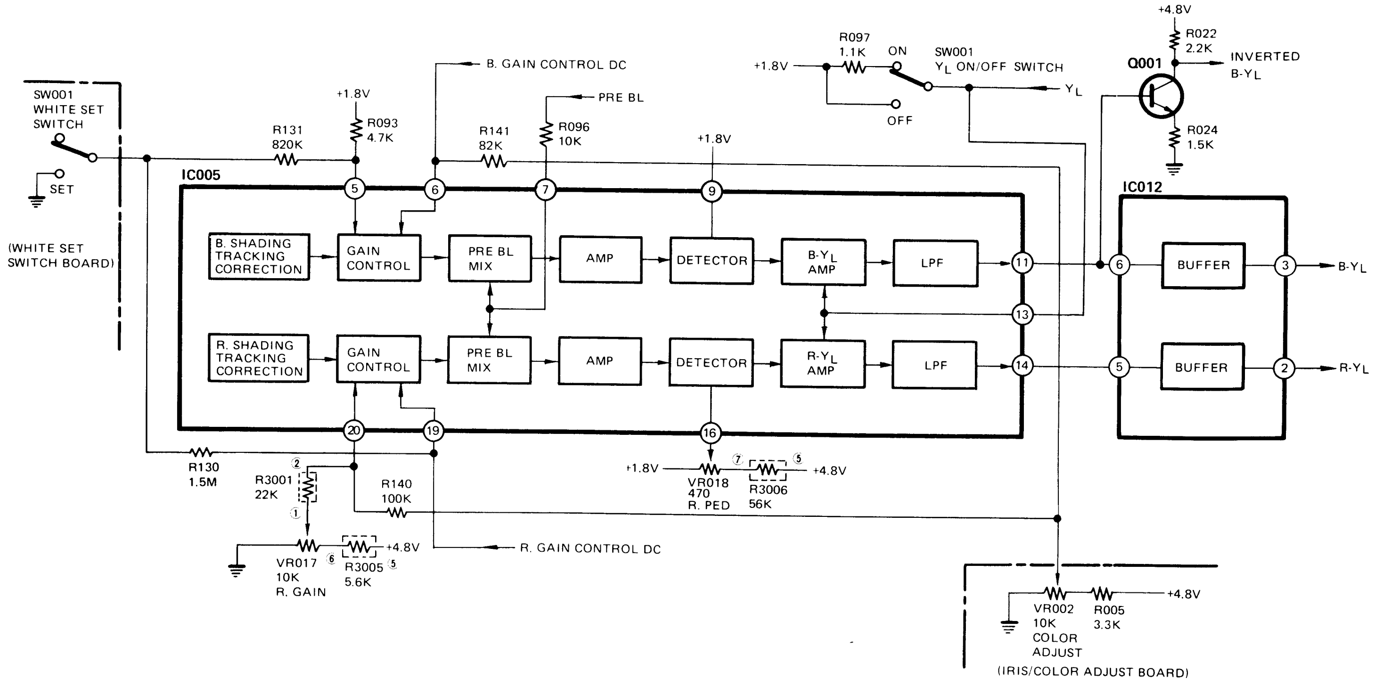

SW001 WHITE SET SWITCH
SET
(WHITE SET SWITCH BOARD)
B. GAIN CONTROL DC
PRE BL
+1.8V
R131 820K
R093 4.7K
R141 82K
R096 10K
+1.8V
IC005
5
6
7
9
B. SHADING TRACKING CORRECTION
GAIN CONTROL
PRE BL MIX
AMP
DETECTOR
B-YL AMP
LPF
11
13
R. SHADING TRACKING CORRECTION
GAIN CONTROL
PRE BL MIX
AMP
DETECTOR
R-YL AMP
LPF
14
20
19
16
R130 1.5M
R3001 22K
R140 100K
VR017 10K R. GAIN
R3005 5.6K
+4.8V
R. GAIN CONTROL DC
+1.8V
VR018 470 R. PED
R3006 56K
+4.8V
R097 1.1K
ON
OFF
SW001 YL ON/OFF SWITCH
YL
+4.8V
R022 2.2K
Q001
INVERTED B-YL
R024 1.5K
IC012
6
BUFFER
3
B-YL
5
BUFFER
2
R-YL
VR002 10K COLOR ADJUST
R005 3.3K
+4.8V
(IRIS/COLOR ADJUST BOARD)

Fig. 4-6-11 R-YL/B-YL Signal Circuit

4-6-6 B-YL Signal Circuit

Outline

This circuit uses the same design as the R-YL signal circuit. The circuit receives the modulated blue(Bc) signal from the blue shading/tracking correction circuit and converts it to the blue (B) signal. The B-YL signal is made by the detected B signal and YL signal supplied from the YL signal circuit, and fed to the chroma encoding circuit.

Details

The Bc signal from the blue shading/tracking correction circuit in IC005 is sent to B-YL amplifier after it undergoes the gain control, the preblanking mixing, the amplification and detection. The B-YL signal made by the detected B signal and the YL signal is fed to the chroma encoding circuit through the low pass filter which removes the 8.6MHz ripple component and buffer in IC012.

The B-YL signal at pin 14 of IC005 is fed through inverter Q001 to the YH signal circuit and mixed with YH signal to compensate for PAL luminance signal.

4-6-7 Chroma Clip Signal Circuit

Outline

When the over input signal level is fed to the amplifier or the beam of pick-up tube is insufficient to discharge the target due to excessive light reflected from a brightly illuminated object, the modulated red/blue signal components riding on to top of the green signal become saturated (Ⓖ and Ⓗ).

Therefore, the bright picture parts turn into an unnatural green color due to lack of red and blue.

This circuit receives the luminance(Y) signal and makes the chroma clip signal for clipping the unnatural green color. The chroma clip signal is sent to the chroma encoding circuit.

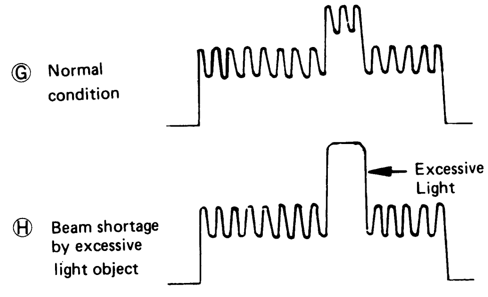

Ⓖ Normal condition
Excessive Light
Ⓗ Beam shortage by excessive light object

Fig. 4-6-12 Beam Shortage

Details

The pre-video signal at pin 24 of IC001 is fed to low pass filter which consists of L101 and C001 and the luminance(Y) signal Ⓘ is made. The Y signal Ⓘ is fed through pin 19 of IC003 to the white clip circuit where the high Y signal level Ⓙ is detected. The detected high Y signal Ⓙ, signal Ⓚ which delayed 0.5 μs by delay line CF007and signal Ⓛ which results from the delayed signal Ⓚ being reflected back through CF007 and delayed again (1 μs) appear at the input of NAM (non-additive mixing) circuit.

The mixing signal Ⓜ (Ⓙ + Ⓛ) is non-additively mixed with the signal Ⓚ and a chroma clip signal Ⓝ is made. The chroma clip signal Ⓝ is fed from the NAM circuit to the chroma encoding circuit through the pulse separator/buffer and pin 23 of IC003, and to the PAL signal processing circuit through R048 together with the positive vertical edge signal comes through R047 (Refer to 4-5 Vertical Edge Signal Generator Circuit.) and the R-Ysignal for R chroma clipping through VR020 (R CHROMA CLIP).

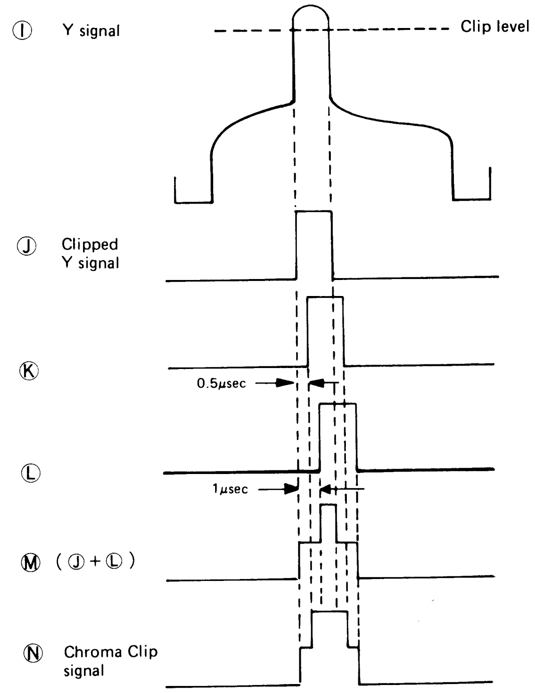

Ⓘ Y signal
Clip level
Ⓙ Clipped Y signal
Ⓚ
0.5μsec
Ⓛ
1μsec
Ⓜ (Ⓙ + Ⓛ)
Ⓝ Chroma Clip signal

Fig. 4-6-13 Chroma Clip Signal

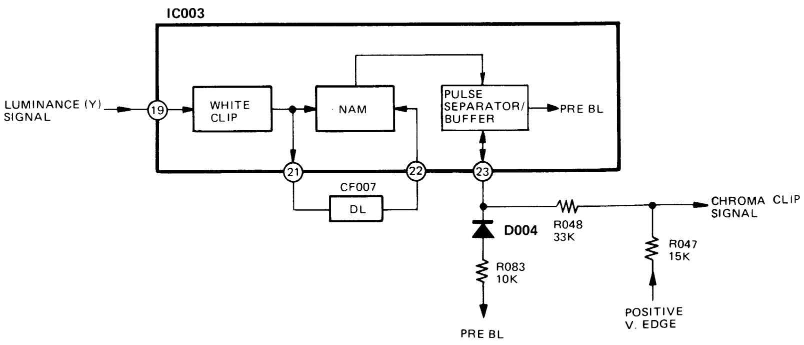

IC003
LUMINANCE (Y) SIGNAL
19
WHITE CLIP
NAM
PULSE SEPARATOR/ BUFFER
PRE BL
21
22
23
CF007
DL
D004
R048 33K
R083 10K
PRE BL
CHROMA CLIP SIGNAL
R047 15K
POSITIVE V. EDGE

Fig. 4-6-14 Chroma Clip Signal Circuit

4-7 Chrominance Encoding Circuit

This circuit contains the +2.5V power circuit, the chrominance signal generator circuit, the chroma clip/suppression circuit and the white set detection circuit.

4-7-1 +2.5V Power Circuit

Outline

This circuit generates the regulated +2.5V DC which is used as power supply for IC004.

Details

+1.8V DC generated inside IC003 is fed through pin 5 and L002 to the emitter of Q003 which is used as a diode. The +2.5V DC obtained at the collector of Q003 is supplied to pin 6 of IC004 as a power supply.

4-7-2 Chrominance Signal Generator Circuit

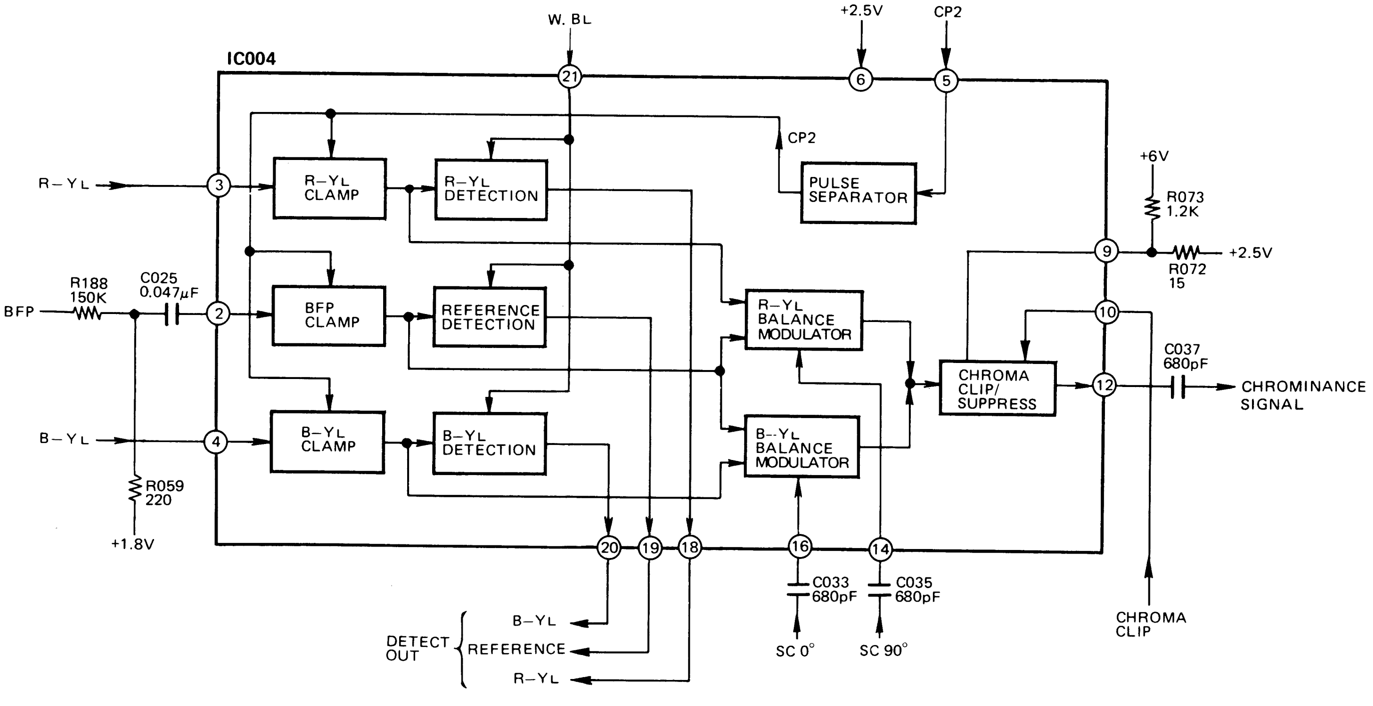
Outline

This circuit receives the R-YL and B-YL color difference signals and modulates these color difference signal by two subcarrier differing in phase by 0° and 90°/270° to generate a chrominance signal. The burst signal is also generated in this circuit.

Details

The R-YL color difference signal is fed from the R-YL signal circuit in IC005 to the R-YL clamp circuit in IC004 through IC012, where the blanking period of R-YL signal is clamped by the clamp pulse-2(CP2) from the pulse separator in IC004. The clamped R-YL signal is then supplied to the R-YL balance modulator where it is mixed with the burst flag pulse (BFP) applied from the pulse generator circuit through pin 2 of IC004 and clamp circuit. The R-YL signal with the burst flag pulse (BFP) modulates the (R-Y) subcarrier ((R-Y)SC) applied to the modulator from the pulse generator circuit through pin 14 of IC004. The modulator produces an DSB (suppressed carrier double side band) signal.

Similarly, the B-YL color difference signal is fed from the B-YL signal circuit to the B-YL balance modulator circuit in IC004 through IC012 and the B-YL clamp circuit, where the B-YL signal is mixed with the burst flag pulse (BFP) supplied through pin 2 of IC004 and BFP clamp circuit. The B-YL signal with the burst flag pulse (BFP) and the (B-Y) subcarrier (its phase differs 90° with respect to R-YL subcarrier) applied to the modulator through pin 16 of IC004 undergo suppressed carrier quadrature modulation. The R-YL modulated signal and the B-YL modulated signal is added forming the chrominance signal with the burst. The chrominance signal is then forwarded to the chroma clip/suppress circuit.



W. BL
+2.5V
CP2
IC004
21
6
5
CP2
R-YL
3
R-YL CLAMP
R-YL DETECTION
PULSE SEPARATOR
+6V
R073 1.2K
9
+2.5V
R072 15
R188 150K
C025 0.047μF
BFP
2
BFP CLAMP
REFERENCE DETECTION
R-YL BALANCE MODULATOR
10
C037 680pF
CHROMA CLIP/ SUPPRESS
12
CHROMINANCE SIGNAL
B-YL
4
B-YL CLAMP
B-YL DETECTION
B-YL BALANCE MODULATOR
R059 220
+1.8V
20
19
18
16
14
C033 680pF
C035 680pF
B-YL
DETECT OUT
REFERENCE
R-YL
SC 0°
SC 90°
CHROMA CLIP

Fig. 4-7-1 Chroma Encording Circuit

4-7-3 Chroma Clip/Suppress Circuit

Outline

This circuit contains the high Y level chroma clip circuit and low level chroma suppress circuit.

The high Y level chroma clip circuit clips the green color which results when an excessively bright object is shot with the camera. (Refer to 4-6-7 Chroma Clip Signal Circuit for details.)

The low level chroma suppression circuit enhances color reproduction in low luminance condition by improving the white balance, when the color of the object is faint.

Details

The chrominance signal with the burst Ⓐ is supplied to the chroma clip/suppress circuit from the R-YL and B-YL balance modulator circuits. The chroma clip signal Ⓑ which is made in the chroma clip signal circuit in IC003 is supplied through pin 10 of IC004 to the chroma clip/suppress circuit where the chrominance signal corresponding to the excessive bright object is clipped Ⓒ and does not reach the PAL output.

The chroma clip signal also suppresses the chrominance signal which appears around the unnatural green color.

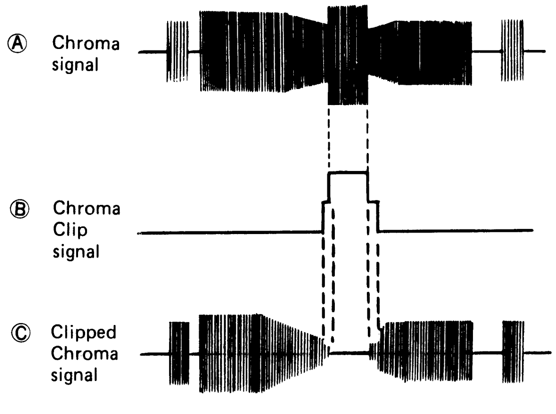


Fig. 4-7-2 Chroma Clip

The DC voltage obtained by dividing the voltage between +6V and +2.5V with R073 and R072, and fed to the chroma clip/suppress circuit through pin 9 of IC004 determines the low suppression level of chroma signal. This DC voltage is applied to the chroma clip/suppress circuit and suppress the low chrominance level.

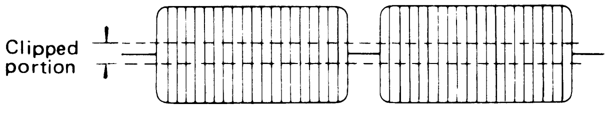


Fig. 4-7-3 Chroma Suppress

4-7-4 White Set Detection Circuit

Outline

This circuit receives the R-YL, B-YL and reference DC voltage from the respective clamp circuits and converts them to the DC voltages. The detected DC voltages are sent to the white balance setting circuit.

Details

The clamped R-YL, the clamped B-YL and the clamped burst flag pulse (BFP) are respectively fed to the detection circuits and their center portions are gated by the wide blanking (W.BL) pulse supplied through pin 21 of IC004 in order to set the white balance with the signal corresponding to the center image. The clamped burst flag pulse is gated by the W.BL pulse, the burst flag pulse is removed and only the clamp DC voltage is detected as a reference DC voltage. The gated signals are converted into the DC voltage in the detection circuit and fed through pins 18, 19 and 20 of IC004 to the white balance setting circuit.

4-8 Burst Generator Circuit

Outline

This circuit gates the burst signal from the mixed signal of the chrominance and burst signals supplied from the chroma encoding circuit and phase-shifted burst is generated. The burst signal is fed to the PAL processing circuit together with the sync signal.

Details

The mixed signal Ⓐ of chrominance and burst signal is fed from pin 12 of IC004 to the collector of burst gate Q005. The burst flag pulse (BFP) Ⓑ is fed from the pulse generator circuit to the base of Q005 to gate the burst signal. The gated burst signal Ⓒ at the collector of Q005 is then fed to phase shifter Q006 through VR009 (BURST LEVEL). The phase-shifted burst signal at the junction point of CT002 (BURST PHASE) and R081 is then mixed with the sync pulse Ⓓ comes from the pulse generator circuit. The mixed signal Ⓔ is supplied to PAL processing circuit to form a composite PAL signal.

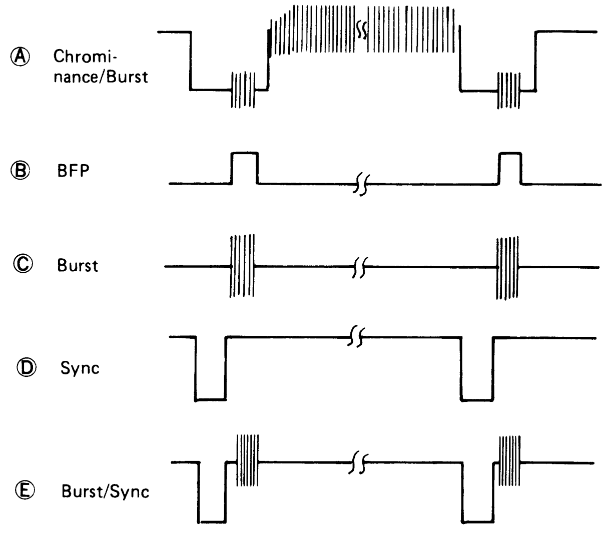


Fig. 4-8-1 Burst Signal

4-9 PAL Signal Processing Circuit

Outline

In this circuit, the chrominance signal, the luminance signal, the blanking signal, the burst signal and the sync signal are mixed to produce a composite PAL signal. The negative colored PAL signal is also made in this circuit. The PAL signal is applied to the portable VTR, or a desk-top type VTR through the power supply.

Details

The chrominance signal is supplied from the burst gate circuit to the chroma gain control circuit inside IC002 through pin 22. The positive vertical edge signal from the vertical edge signal generator and the chroma clip signal from the chroma clip signal circuit are mixed together through R047 and R048 and fed via pin 20 to the chroma gain control circuit, where these signals controls the chrominance signal level.

In the chroma clip/suppress circuit previously explained, the green color which results when the excessively bright object is shot with the camera is clipped by the chroma clip signal. (Refer for the detail to 4-7-3 Chroma Clip/Suppress Circuit.) The chroma clip signal supplied to the chroma gain control circuit minimizes the remaining chrominance signal corresponding to the excessively bright object.

The vertical transient spurious correction circuit previously described minimizes the unnatural color appears at the vertical edge of object. (Refer for the detail to 4-6-2 Vertical Transient Spurious Correction Circuit.) The positive vertical edge signal supplied to the chroma gain control circuit decreases the chrominance signal corresponding to the unnatural color at the vertical edge. The chrominance signal Ⓐ undergoes the chroma gain control is fed to the Y/chroma/aperture mixing circuit inside IC002. The mixed signal Ⓑ of the luminance (YH) signal and the vertical(V) edge signal is fed to the mixing circuit. The horizontal aperture signal from the horizontal(H) aperture generator circuit and the H.aperture suppress circuit to the mixing circuit through pin 4 of IC002. In the mixing circuit, these signals are mixed.

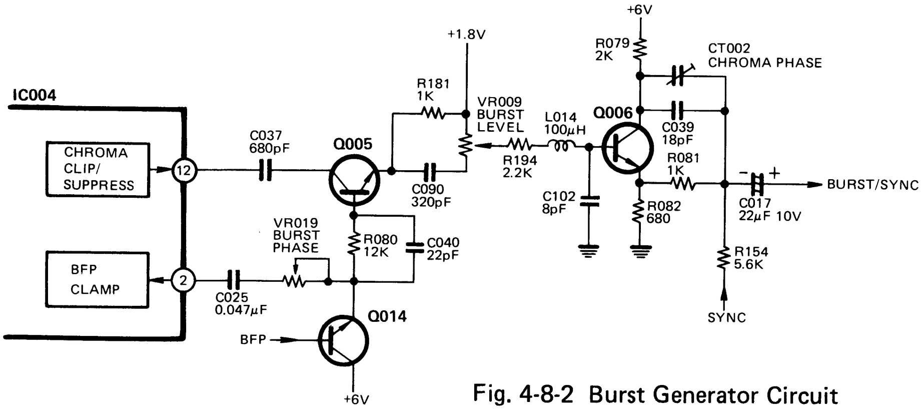


Fig. 4-8-2 Burst Generator Circuit

The mixed signal Ⓒ is supplied to the fade circuit where its signal level is controlled by the fade control signal supplied from the fade/recording control circuit through pin 24 of IC002. (Refer for the details to 4-12 fade/recording control circuit.)

The mixed signal is then fed through the negative/positive select circuit to the character mix circuit where the characters/graphics signals such as calendar/date or stopwatch superimposed onto the PAL signal is mixed. The characters/graphics signals are sent from the Deflection board through pin 15 of IC002.

The mixed signal is forwarded through pins 6 and 7 of IC002 to the clamp circuit, where the blanking level of the mixed signal is clamped by the clamp pulse-2 (CP2) supplied from the pulse separator inside IC002.

The clamped signal is then sent to the BL mix/high clip/low clip circuit, where it is mixed with the blanking (BL) pulse Ⓓ . The high clip circuit clips the signal exceeds 120 IRE unit (0.85V) and the low clip circuit clips the low level portion of mixed signal Ⓓ for setting the pedestal level Ⓔ .

The mixed signal Ⓕ of chrominance and luminance signals which undergoes the high and low clip is mixed with the mixing signal Ⓕ of sync and burst signal through pin 12 in the PAL output circuit forming a composite PAL signal Ⓖ .

The PAL signal at pin 13 of IC002 is supplied to the VTR through R043, C018 and terminal No. 5 of CN006. The PAL signal is also supplied to 4.43MHz trap CF004 where the chrominance signal is removed and the luminance signal remains. The luminance signal is then fed to the electronic viewfinder through terminal No. 8 of flat cable JC and the Deflection board.

When the camera is used in the normal condition, the high level of nega/posi control signal is fed from the Micro processor board through terminal No. 5 of flat cable JD and pin 21 of IC002 to the negative/positive select circuit for selecting the positive position and the normal picture is observed.

If the nega/posi select switch on the side of camera is pressed, the nega/posi control signal is converted from the high level to the low level and the negative position is selected. Therefore when the camera is used for shooting the negative film, the normal picture can be observed by pressing the nega/posi select switch on the side of the camera. However, since the color reproduction characteristic of negative film is different, the chrominance signal amplitude corresponding to the high Y level is extremely high. Q002 suppresses the chrominance signal when the camera is used in the negative position. In the negative position, the low level of nega/posi control signal is fed to the base of Q002 turning off Q002. When the Q002 is turned OFF, the YL signal obtained at pin 17 of IC002 is fed through R186, R185 and pin 20 of IC002 to the chroma gain control circuit where the YL signal suppresses the chrominance signal corresponding to the high Y level. In the positive position, the high level is sent to the base of Q002 and Q002 is turned ON. Therefore, the YL signal is not fed to the chroma gain control circuit.

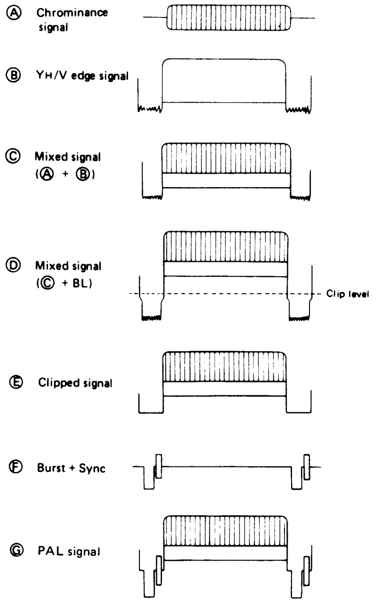

Ⓐ Chrominance signal
Ⓑ YH/V edge signal
Ⓒ Mixed signal (Ⓐ + Ⓑ)
Ⓓ Mixed signal (Ⓒ + BL)
Clip level
Ⓔ Clipped signal
Ⓕ Burst + Sync
Ⓖ PAL signal

Fig. 4-9-1 PAL Signal

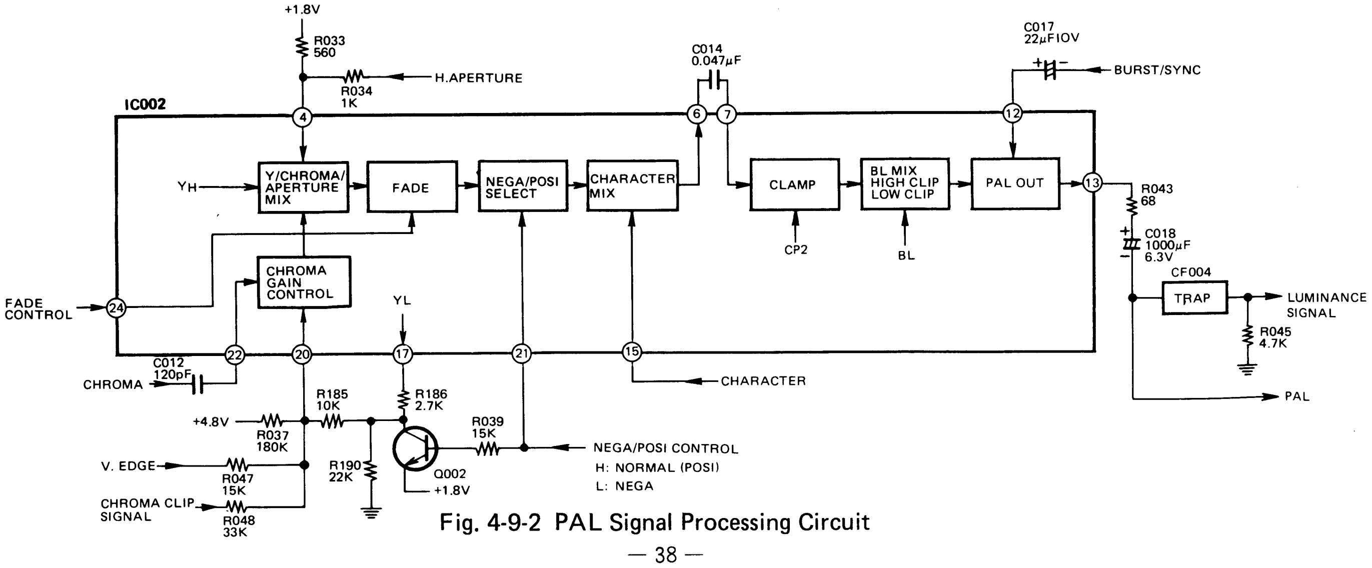

+1.8V
R033
560
H.APERTURE
R034
1K
IC002
C014
0.047μF
C017
22μF10V
BURST/SYNC
4
6
7
12
13
YH
Y/CHROMA/APERTURE MIX
FADE
NEGA/POSI SELECT
CHARACTER MIX
CLAMP
BL MIX HIGH CLIP LOW CLIP
PAL OUT
CP2
BL
R043
68
C018
1000μF
6.3V
CF004
TRAP
LUMINANCE SIGNAL
R045
4.7K
PAL
CHROMA GAIN CONTROL
FADE CONTROL
24
YL
22
20
17
21
15
CHARACTER
C012
120pF
CHROMA
R185
10K
R186
2.7K
+4.8V
R037
180K
R039
15K
NEGA/POSI CONTROL
H: NORMAL (POSI)
L: NEGA
V. EDGE
R047
15K
R190
22K
Q002
+1.8V
CHROMA CLIP SIGNAL
R048
33K

Fig. 4-9-2 PAL Signal Processing Circuit

4-10 Playback Detect Circuit

Outline

This circuit detects the recording or playback mode of the portable VTR and sends the detected information to the Micro processor board and the playback control signal is fed back to this circuit. When the portable VTR is set into the recording mode, the playback control signal sets the camera to supply the PAL output signal to the viewfinder and the portable VTR for recording. When the portable VTR is set into the playback mode, the playback control signal shuts off the camera function and supplies the playback signal from VTR to the viewfinder.

Details

When the portable VTR is set into the recording mode, no DC voltage is applied through R044 and terminal No. 11 of the flat cable JD to the Micro processor board. The low level obtained in the Micro processor board is fed back through terminal No. 3 of JD to the anode of D003 and D003 turns OFF. Therefore the PAL output circuit works properly and sends the PAL signal to the viewfinder and the portable VTR for recording. When the portable VTR is set into the playback mode, the playback signal which rides on top of +6V DC is supplied from the VTR through terminal No. 5 of CN006. The playback signal is removed by C016 and the remaining +6V DC is fed to the Micro processor board. The low level generated in the Micro processor board is converted to the high level by the +6V DC and fed back to the anode of D003 turning ON D003. The high level is supplied to the PAL output circuit to shut it OFF. In this way the PAL signal is not generated in the camera and only playback signal from the portable VTR is supplied to the viewfinder through trap CF004.

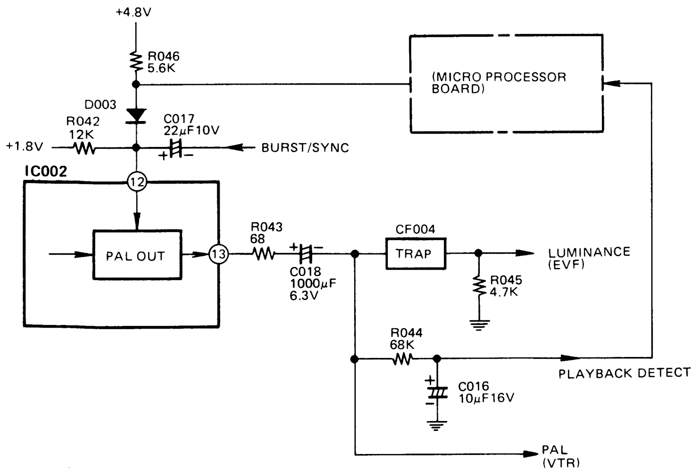


Fig. 4-10 Playback Detect Circuit

4-11 White Balance Setting Circuit

Outline

This circuit automatically sets the white balance of picture by controlling the amplitude of red and blue signals respectively. (Proper white balance or color balance means that the camera will reproduce a white object in the picture as white.)

Since the scene illumination contributes to color in balance, a diffusion filter is placed between the lens and the pick-up tube when the white set switch is placed in the SET position. Therefore, white setting uses the same light as will be used later.

When the SET position is chosen, the automatic cycle in the camera increases or decreases R and B signals in step and stops when each of these levels is equal to the green (YL) level. At this point, the R-YL and B-YL signals are both 0(zero), the picture is white and white balance has been achieved.

This is indicated by the graphics displayed in the viewfinder. The flashing graphics WHITE will be displayed after the power switch is turned ON and while the white balance is being set. It will go OFF or the graphics WHITE OK are displayed when the automatic white balance process is finished.

Details

When the power switch is turned ON, the positive reset pulse is generated in the Micro processor board. This reset pulse is fed through terminal No. 17 of the flat cable JD and pin 13 of IC009 to the reset circuit and IC009 is reset. The DC voltage made by resetting and obtained at pin 10 and pin 2 of IC009 are supplied to the gain control circuit in the R-YL and B-YL signal circuits through R132/pin 19 of IC005 and R134/pin 6 to set the initial gain of R and B signals respectively. As a result, the R signal and B signal levels are set and camera will produce average white balance for 3200 K illumination when the power is first applied.

At this time, the high(H) is fed from the AWC warning circuit inside IC009 to the Micro processor board through pin 21 of IC009 and terminal No. 16 of flat cable JD for displaying the flashing graphics WHITE on the viewfinder. When the graphics are displayed, the white balance should be set by placing the white set switch SW001 on the side of camera to the SET position while aiming the camera at the white object or white paper.

When the white set switch SW001 is placed to the SET position, pin 16 of IC009 is grounded, the 15Hz clock pulse is fed from the counter control circuit inside IC009 to the 6-bit up/down counters and the counters start counting up or down depending on the levels at pin 14 and pin 12 of IC009. (The 15Hz clock pulse is made by frequency-dividing the 60Hz vertical scanning start (Vs) pulse in the counter control circuit.) As the counters count up or down the digital/analog (D/A) converter produce staircase signals. The voltage levels of these D/A converter will set the R and B gain.

These DC voltages are sent to the gain control circuit in IC005 and control the R and B signal levels which was initially set for 3200 K illumination.

As the increasing or decreasing voltages made by the stairsteps raise the gain of R and B channels, the levels of R-YL and B-YL signal increase or decrease at pins 14 and 11 of IC005. To determine for the up/down counters counting up or down, an OP-amp for each channel (IC010 pins 5, 6, 7 for red, pins 1, 2, 3 for blue) compares the detected signal levels (DC) which appear at IC004 (pin 18 : R-YL detected DC, pin 20 : B-YL detected DC, pin 19 : reference detected DC). The outputs of comparison at pin 7 and pin 1 of IC010 are sent to the up/down counters through pins 14 and 12 of IC009.

The output of comparator at pin 7 is high(H) when the R signal level is below the YL signal (The R-YL detected DC level is below the reference detected DC level.), and the counter starts counting up.

The increased DC voltage from the D/A converter is fed to the red gain control circuit to increase the red signal level.

When the R signal just exceeds the YL signal, the comparator switches its output to low and the counter starts counting down. The decreased DC voltage reduces the R signal level. This loop works until the R signal level is equal to the YL signal. The B channel works in a similar fashion.

The counters stop counting automatically about 5 seconds after the white set switch SW001 is placed to the SET position and white balance has been achieved. At the same time, the high(H) from the AWC warning circuit is switched to low(L) and the flashing graphics WHITE goes OFF from the viewfinder or the graphics WHITE OK are displayed.

Since the diffusion filter has itself an inherent color filtering effect, the white balance shifts slightly when the white setting is accomplished and diffusion filter is removed. When in the white set mode, the gains of gain control circuits for the R and B signal are slightly shifted by grounding the R130 and R131 and the white balance is set. When the white setting is accomplished and the white set switch is placed in the normal mode the gains are returned to the previous mode for an almost exact match.

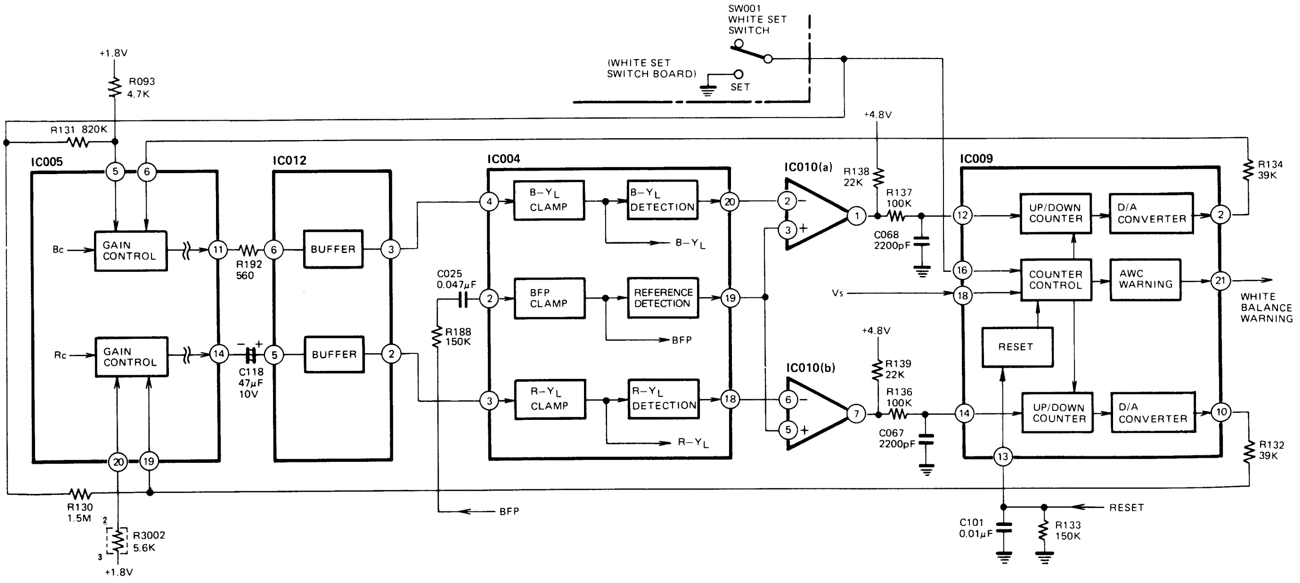

SW001
WHITE SET
SWITCH
(WHITE SET
SWITCH BOARD)
SET
+1.8V
R093
4.7K
R131 820K
IC005
GAIN CONTROL
GAIN CONTROL
Bc
Rc
IC012
BUFFER
BUFFER
R192
560
C118
47μF
10V
C025
0.047μF
R188
150K
IC004
B-YL CLAMP
B-YL DETECTION
B-YL
BFP CLAMP
REFERENCE DETECTION
BFP
R-YL CLAMP
R-YL DETECTION
R-YL
BFP
+4.8V
IC010(a)
R138
22K
R137
100K
C068
2200pF
Vs
+4.8V
IC010(b)
R139
22K
R136
100K
C067
2200pF
IC009
UP/DOWN COUNTER
D/A CONVERTER
COUNTER CONTROL
AWC WARNING
RESET
UP/DOWN COUNTER
D/A CONVERTER
R134
39K
WHITE BALANCE WARNING
R132
39K
RESET
C101
0.01μF
R133
150K
R130
1.5M
R3002
5.6K
+1.8V

Fig. 4-11 White Balance Setting Circuit

4-12 VTR Remote Control/Fade Control Circuit

This circuit consists of the VTR remote control circuit and the fade control circuit.

4-12-1 VTR Remote Control Circuit

Outline

This circuit generates VTR start/stop (pause) control signal. When the VTR is set into the recording mode, the VTR is started by a high potential from this circuit. If a low potential is sent to the VTR, it stops (pauses). This circuit also has the VTR compatibility switch for other VTR which is started by a low potential and stopped by a high potential.

Details

When the VTR compatibility switch SW003 is set in the + (normal) position, the VTR is set in the recording mode and the power switch is turned ON, the potential at pin 15 and pin 17 of IC006 are set to low and high respectively by the power reset circuit inside IC006. The low at pin 15 is fed through terminal No. 4 of CN006 and terminal No. 6 of VTR connector CN110 to the VTR to stop (pause) it.

At the same time, the high at pin 17 is fed to the Micro processor board and the graphics REC is not displayed in the viewfinder.

When the non-lock type VTR start/stop switch SW101 is depressed (refer to 1ST TRIGGER in Fig. 4-12-2), the negative trigger pulse is generated. It is fed to the fade/rec control circuit inside IC006 through pin 18 and the potential at pin 15 and pin 17 is reversed. The high at pin 15 is fed to the VTR to start recording.

At the same time, the low at pin 17 is sent to the Micro processor board and the graphics REC is displayed in the viewfinder.

When the subsequent trigger pulse is sent to the fade/rec control circuit by depressing SW101 again (refer to 2ND TRIGGER in Fig. 4-12-2), the potential at pin 15 and pin 17 is inverted. As a result, the VTR is stopped and the REC graphics go OFF.

The VTR compatibility switch SW004 inverts the potential of VTR recording control signal at pin 15 of IC006 for other VTR which starts with low potential and stops with high potential.

When the portable VTR is set to the playback mode, an inhibit signal (high level) from the VTR is supplied to the base of Q012 on Micro processor board to turn it ON setting the potential at pin 7 of IC006 to low. The fade/rec control circuit is reset by the low potential at pin 7 and the potential at pin 15 and pin 17 are forced low and high respectively. In this state, even if another trigger pulse is sent to the fade/rec control circuit by depressing SW101, the fade/rec control circuit remains set. Therefore, the REC graphics are not displayed in the viewfinder. This condition is maintained until the playback mode is released and set to the recording mode again.

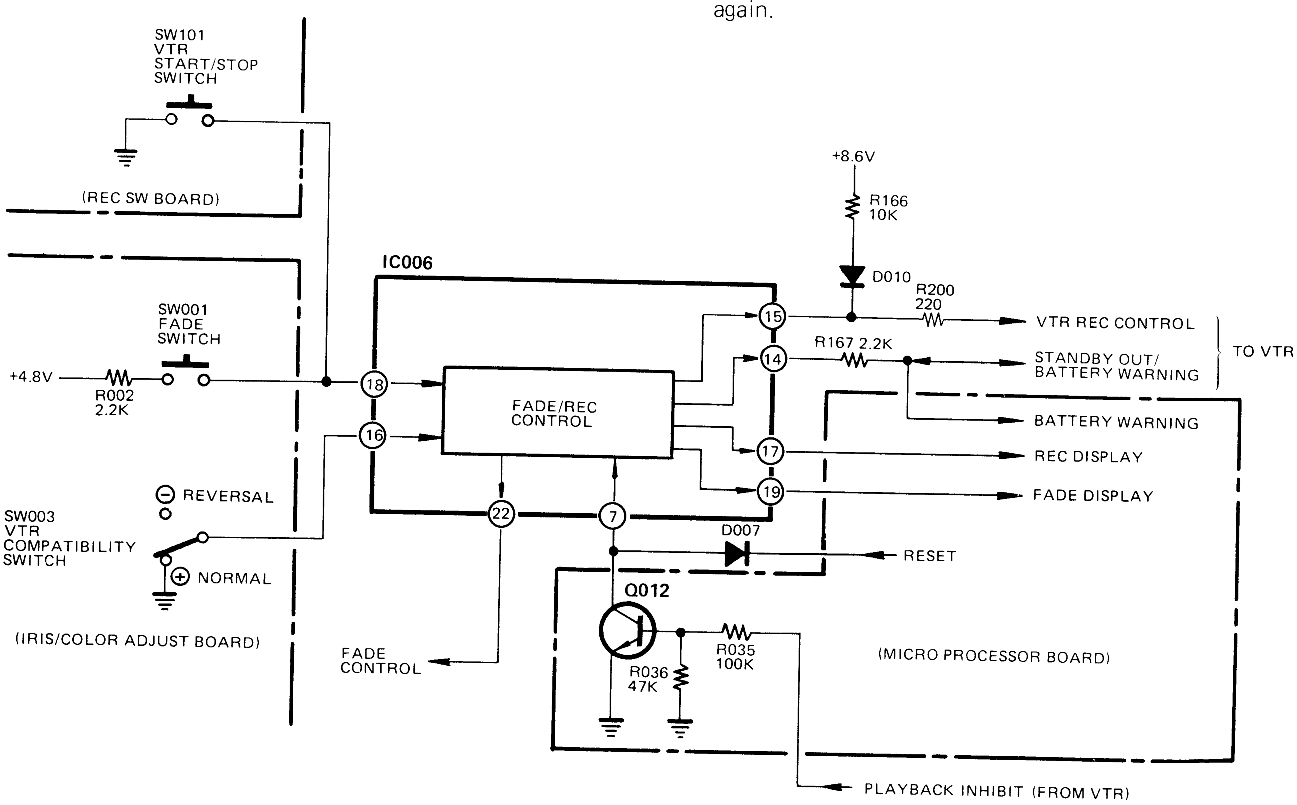

SW101
VTR
START/STOP
SWITCH
(REC SW BOARD)
IC006
SW001
FADE
SWITCH
+4.8V
R002
2.2K
18
16
FADE/REC
CONTROL
22
7
15
14
17
19
⊖ REVERSAL
SW003
VTR
COMPATIBILITY
SWITCH
⊕ NORMAL
(IRIS/COLOR ADJUST BOARD)
FADE
CONTROL
+8.6V
R166
10K
D010
R200
220
R167 2.2K
VTR REC CONTROL
STANDBY OUT/
BATTERY WARNING
TO VTR
BATTERY WARNING
REC DISPLAY
FADE DISPLAY
D007
RESET
Q012
R035
100K
R036
47K
(MICRO PROCESSOR BOARD)
PLAYBACK INHIBIT (FROM VTR)

Fig. 4-12-1 VTR Remote Control Circuit

When the standby switch on the rear of the camera is set to the standby mode (STANDBY - 1 and 2), the low potential is fed to the cathode of D007 from the Micro processor board setting the potential at pin 7 to low. The fade/rec control circuit is reset by the low at pin 7 and the potential at pin 15 and pin 17 are forced low and high as in the case of playback mode. The condition is maintained until the standby switch is reset to the ON position.

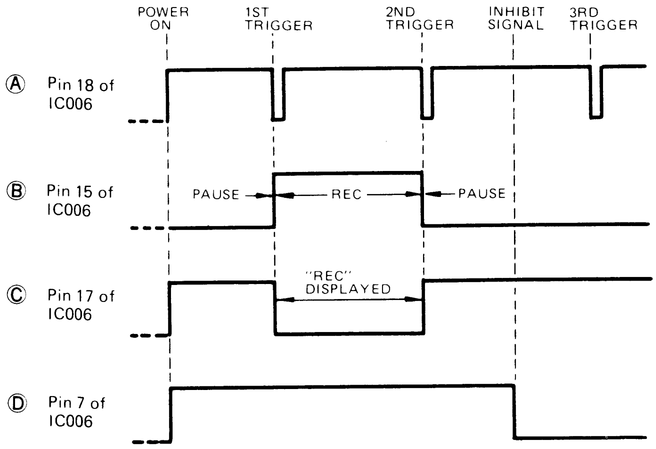


Fig. 4-12-2 VTR Remote Control

4-12-2 Fade Control Circuit

Outline

This circuit generates the fade control signal and sends it to the PAL signal processing circuit to control the video fade-in/out effects.

When the VTR is in recording mode, if the VTR start-/stop switch is depressed after pressing the fade switch, the fade-out effect is obtained and the VTR pauses, then the picture reappears.

If the VTR is in pause, depressing the VTR start/stop switch after pressing the fade switch located on side of the camera, the video will fade out, the VTR starts recording and the video fades in again.

If the VTR start/stop switch is depressed without pressing the fade switch, no fade effect occurs and the VTR is remote-controlled as described in VTR remote control circuit.

Details

● Fade-in effect

When the momentary fade switch SW001 on IRIS-/COLOR Adjust board is depressed (Ⓔ, 1ST TRIGGER), the DC level at pin 18 of IC006 becomes high. This high level initiates the fade/rec control circuit in IC006. This trigger signal Ⓔ changes the potential at pin 19 of IC006 from high to low Ⓙ. The low level is fed to the Micro processor board and the graphics F is displayed in the viewfinder. Then when the VTR start/stop switch SW101 is depressed (Ⓕ, 1ST TRIGGER), pin 18 of IC006 goes low and the DC level at pin 22 of IC006 starts increasing gradually Ⓗ. After about few seconds the potential at pin 15 becomes high Ⓛ and the VTR starts recording. The potential at pin 17 of IC006 conversely goes low Ⓚ and it is fed to the Micro processor board to display the graphics REC in the viewfinder. Simultaneously the DC level at pin 22 starts decreasing gradually. This DC level Ⓗ at pin 22 is fed to the fade control circuit in the PAL signal processing circuit in IC002 to control the PAL signal level Ⓘ. This means that the VTR start/stop switch is pressed, the PAL signal is decreased gradually at first and then appears again gradually (fade-in effect) after recording starts. Therefore the recording proceeds as shown Ⓜ. When the fade-in effect is completed, the potential at pin 19 is changed from low to high Ⓙ and the graphics F goes OFF.

If the VTR start/stop switch SW101 is depressed independently after fade-in effect is accomplished (Ⓕ, 2ND and 3RD TRIGGER), the VTR can be controlled remotely as previously described in VTR remote control circuit.

If the fade switch SW001 is depressed again after it is initially pressed (Ⓔ, 3RD and 4TH TRIGGER), the initial setting for fade effect will be cancelled.

● Fade-out effect

As in the case of fade-in effect, if the VTR start/stop switch SW101 is depressed (Ⓕ, 4TH TRIGGER) after pressing the fade switch SW001 (Ⓔ, 2ND TRIGGER), the DC level at pin 22 of IC006 starts increasing gradually to fade-out the video. After few seconds, the potential at pin 15 changes from high to low and VTR stops (pause) then potential at pin 22 decreasing gradually. This DC level at pin 22 is fed to the fade control circuit to control the PAL signal level.

When the VTR start/stop switch is pressed after depressing the fade switch, the picture disappears at first (fade-out effect), VTR pauses and then the picture appears again gradually for next recording.

When the VTR stops, both the graphics REC and F disappears from the viewfinder.

When the portable VTR is set to the playback mode or the standby switch is set to the standby position, pin 7 of IC006 becomes low and the fade/rec control circuit is reset as described in 4-12-1 VTR Remote Control Circuit. Therefore the fade/rec control circuit is not controlled by depressing the VTR start/stop switch and the fade switch.

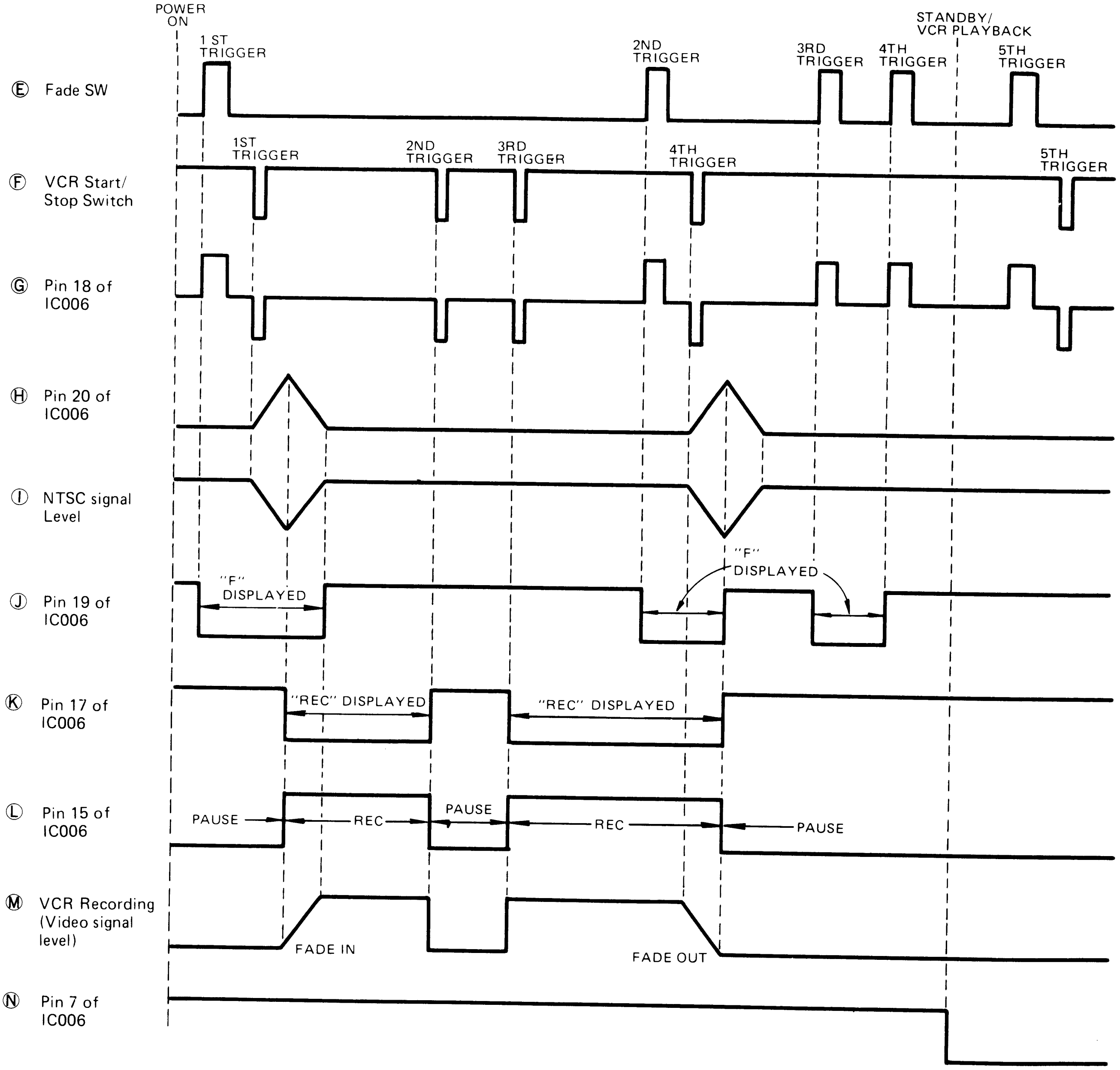

POWER ON
1 ST TRIGGER
2ND TRIGGER
3RD TRIGGER
4TH TRIGGER
STANDBY/ VCR PLAYBACK
5TH TRIGGER
Ⓔ Fade SW
1ST TRIGGER
2ND TRIGGER
3RD TRIGGER
4TH TRIGGER
5TH TRIGGER
Ⓕ VCR Start/ Stop Switch
Ⓖ Pin 18 of IC006
Ⓗ Pin 20 of IC006
Ⓘ NTSC signal Level
"F" DISPLAYED
"F" DISPLAYED
Ⓙ Pin 19 of IC006
"REC" DISPLAYED
"REC" DISPLAYED
Ⓚ Pin 17 of IC006
PAUSE
REC
PAUSE
REC
PAUSE
Ⓛ Pin 15 of IC006
Ⓜ VCR Recording (Video signal level)
FADE IN
FADE OUT
Ⓝ Pin 7 of IC006

Fig. 4-12-3 Fade Control

5. Correction Board (YFVPKA0808JA)

The Correction Board contains following circuits.

Page
5-1 Vertical Sawtooth/Parabola Generator Circuit 44
5-2 Horizontal Sawtooth/Parabola Generator Circuit 44
5-3 Bias Light Shading Correction Signal Generator Circuit 45
5-4 Dynamic Focus Correction Signal Generator Circuit 45
5-5 Red Shading Correction Signal Generator Circuit 46
5-6 Blue Shading Correction Signal Generator Circuit 46

5-1 Vertical Sawtooth/Parabola Generator Circuit

Outline

This circuit generates the vertical sawtooth and parabola waveforms needed in the red and blue shading correction signal generator circuits, dynamic focus correction signal generator circuit and bias light shading correction signal generator circuit on Correction board.

Details

The vertical scanning start pulse (Vs) from Process board enters the base of Q002 through terminal No. 1 of CN001.
The Vs pulse is then fed to a miller integrator consisting of R002, C001 and IC001 (a) and converted into a vertical sawtooth signal.
The V.sawtooth signal at pin 1 of IC001 (a) is fed to the wiper arms of VR002 (R-V.SAW) for the red shading correction, VR006 (B-V.SAW) for the blue shading correction and VR010 (DF V.SAW) for dynamic focus correction.
The V.sawtooth signal at pin 1 is also supplied to another miller integrator consisting of R003, C003 and IC001 (b) to convert it into a parabola signal.
The V. parabola signal obtained at pin 7 of IC001 (b) is fed to the wiper arms of VR001 (R-V.PARA) for the red shading correction, VR005 (B-V.PARA) for blue shading correction and VR009 (DF V.PARA) for dynamic focus correction.

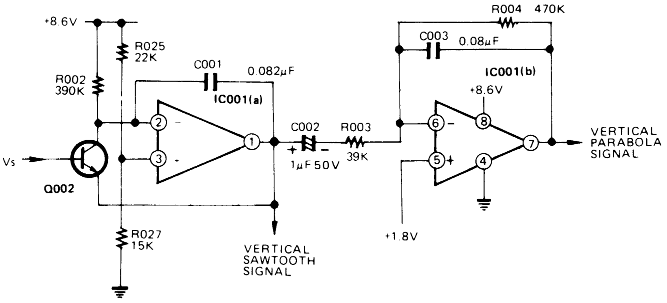

+8.6V
R025
22K
R002
390K
C001
0.082μF
IC001(a)
Vs
Q002
R027
15K
VERTICAL SAWTOOTH SIGNAL
C002
1μF 50V
R003
39K
R004 470K
C003 0.08μF
IC001(b)
+8.6V
+1.8V
VERTICAL PARABOLA SIGNAL

Fig. 5-1 Vertical Sawtooth/Parabola Generator Circuit

5-2 Horizontal Sawtooth/Parabola Generator Circuit

Outline

This circuit generates the horizontal sawtooth and parabola waveforms needed in the red and blue shading correction signal generator circuits dynamic focus correction signal generator circuit and bias light shading correction signal generator circuit on Correction board.

Details

The horizontal scanning start pulse (Hs) from the Process circuit board enters the base of Q001 through terminal No. 2 of CN001.
The Hs pulse is then fed to a miller integrator consisting of R024, C005 and IC002 (a) and converted into a sawtooth signal.
The H.sawtooth signal at pin 1 of IC002 (a) is fed to the wiper arms of VR004 (R-H.SAW) for the red shading correction, VR008 (B-H.SAW) for the blue shading correction, VR012 (DF H.SAW) for the dynamic focus correction and VR013 (Bs H.SAW) for the bias light shading correction.
The H.sawtooth signal at pin 1 is also supplied to another miller integrator consisting of R026, C007 and IC002 (b) to convert it into a parabola signal.
The H.parabola signal obtained at pin 7 of IC002 (b) is fed to wiper arms of VR003 (R-H.PARA) for the red shading correction, VR007 (R-H.PARA) for the blue shading correction, VR011 (DF H.PARA) for the dynamic focus correction and VR014 (Bs H.PARA) for the bias light shading correction.

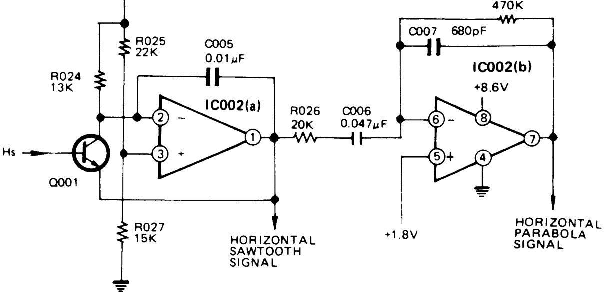

+8.6V
R025
22K
R024
13K
C005
0.01μF
IC002(a)
Hs
Q001
R027
15K
HORIZONTAL SAWTOOTH SIGNAL
R026
20K
C006
0.047μF
R028
470K
C007 680pF
IC002(b)
+8.6V
+1.8V
HORIZONTAL PARABOLA SIGNAL

Fig. 5-2 Horizontal Sawtooth/Parabola Generator Circuit

5-3 Bias Light Shading Correction Signal Generator Circuit

Outline

This circuit generates the bias light shading correction signal and supplies it to process board.
The light intensity by the bias light LEDs is not uniform along the entire target surface. Therefore, the bias current which is produced by the pick-up tube is not uniform, but has a shading Ⓐ.
As described in the section on the principles of single carrier frequency multiplexing, the red and blue signals are obtained by detecting the modulated signals from the preamplifier output using a band pass filter. Therefore, the red and blue signals are free from bias light shading.
However, the luminance signal is obtained by removing the modulated signal using a trap circuit. Therefore, the luminance signal receives undesirable bias light shading. The bias light shading correction which contains the horizontal sawtooth and parabola signals Ⓑ to the signal processing circuit to mix it to the preamplifier output signal for correcting color shading at low illumination levels Ⓒ.

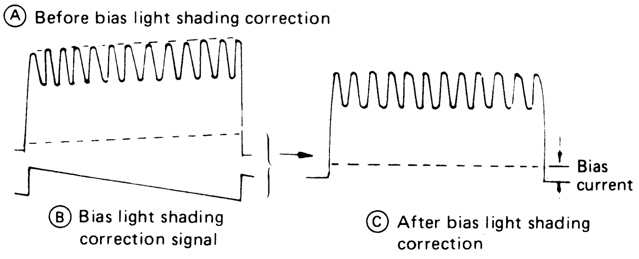

Ⓐ Before bias light shading correction
Bias
current
Ⓑ Bias light shading correction signal
Ⓒ After bias light shading correction

Fig. 5-3-1 Bias Light Shading Correction

Details

The horizontal sawtooth signal from pin 1 of sawtooth generator IC002 (a), the horizontal parabola signal from pin 7 of parabola generator IC002 (b) to the wiper arms of bias light shading correction control VR013 (Bs H.SAW) and VR014 (Bs H.PARA) respectively.
These output of IC004 (b) at pin 7 produces a positive or negative bias light shading correction signal which depends on the position of these controls and it is fed to the signal processing circuit on process board.

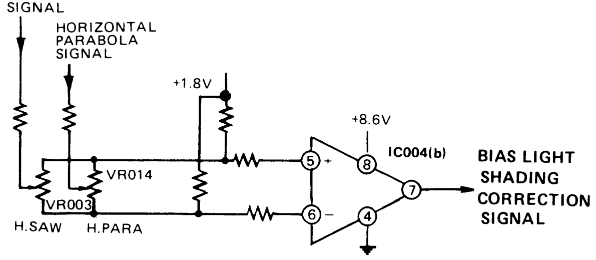

HORIZONTAL SAWTOOTH SIGNAL
HORIZONTAL PARABOLA SIGNAL
+1.8V
+8.6V
IC004(b)
VR014
VR003
H.SAW
H.PARA
5
6
8
4
7
BIAS LIGHT SHADING CORRECTION SIGNAL

Fig. 5-3-2 Bias Light Shading Correction Signal Generator Circuit

5-4 Dynamic Focus Correction Signal Generator Circuit

Outline

This circuit generates the dynamic focus correction signal and supplies it to grid-4 (G4) of the pick-up tube. Generally, the focus voltage which brings the beam in focus in the center part of the pick-up tube is different in level from the voltage which brings the edge portions of the pick-up tube into best focus so that the modulation depth for the center part and the edge portions of the pick-up tube differ. When the camera is directed at an evenly illuminated white object, the red and blue signals modulated at 4.3MHz do not have a uniform level, and as a result, a color shading appears Ⓓ.
The dynamic focus correction signal which contains the horizontal and vertical sawtooth and parabola signals.

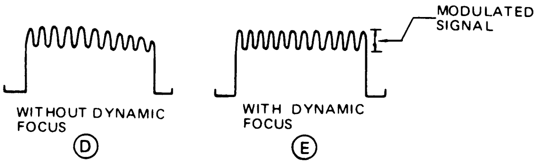

MODULATED SIGNAL
WITHOUT DYNAMIC FOCUS
Ⓓ
WITH DYNAMIC FOCUS
Ⓔ

Fig. 5-4-1 Dynamic Focus Correction

Details

The vertical sawtooth signal from pin 1 of sawtooth generator IC001 (a), the vertical parabola signal from pin 7 of parabola generator IC001 (b), the horizontal sawtooth signal from pin 1 of sawtooth generator IC002 (a), the horizontal parabola signal from pin 7 of parabola generator IC002 (b) to the wiper arms of dynamic focus correction control VR009 (DF V.PARA), VR010 (DF V.SAW), VR011 (DF H.PARA) and VR012 (DF H.SAW) respectively.
These waveforms are applied to both the inverted (pin 2) and non-inverted (pin 3) inputs of IC004 (a), where they are amplified.
The output of IC004 (a) at pin 1 produces a positive or negative dynamic focus correction signal which depends on the position of these controls and it is fed to grid-4 (G4) of the pick-up tube through process board and deflection board.

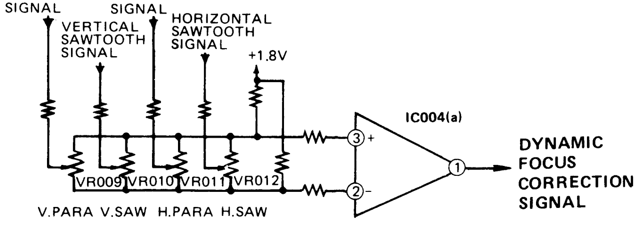

VERTICAL PARABOLA SIGNAL
HORIZONTAL PARABORA SIGNAL
VERTICAL SAWTOOTH SIGNAL
HORIZONTAL SAWTOOTH SIGNAL
+1.8V
IC004(a)
3
2
1
VR009
VR010
VR011
VR012
V.PARA V.SAW H.PARA H.SAW
DYNAMIC FOCUS CORRECTION SIGNAL

Fig. 5-4-2 Dynamic Focus Correction Signal Generator Circuit

5-5 Red Shading Correction Signal Generator Circuit

Outline

This circuit generates the red shading correction signal and supplies it to process board.
Even when dynamic focus correction is applied to grid-4 of pick-up tube, the non-uniformity of modulation due to uneven focus on the target can not be completely eliminated.
Modulation un-uniformity also occurs due to non-uniform structure in the photoconductive layer of the pick-up tube (manufacture tolerance).
The shading correction signal which contains the horizontal and vertical sawtooth and parabola signals is fed to the shading correction circuit to compensate for residual picture shading (Refer to 4-6-3 Shading Correction Circuit).

Details

The vertical sawtooth and parabola signals, and horizontal sawtooth and parabola signals which are generated by the vertical sawtooth/parabola generator circuit and horizontal sawtooth/parabola generator circuit are routed to the wiper arms of the red shading correction controls VR001 (R-V.PARA), VR002 (R-V.SAW), VR003 (R-H.PARA) and VR004 (R-H.SAW).
These signals are applied to both the inverted (pin 6) and non-inverted (pin 5) inputs of IC003 (b), where they are amplified.
The output of IC003 (b) at pin 7 produces a positive or negative red shading correction signal which depends on the position of these controls and it is fed to the shading correction circuit on the process board.

5-6 Blue Shading Correction Signal Generator Circuit

Outline

This circuit generates the blue shading correction signal and supplies it to process board.

Details

The vertical sawtooth and parabola signals, and horizontal sawtooth and parabola signals which are generated by the vertical sawtooth/parabola generator circuit and horizontal sawtooth/parabola generator circuit are routed to the wiper arms of the blue shading correction controls VR005 (B-V.PARA), VR006 (B-V.SAW), VR007 (B-H.PARA) and VR008 (B-H.SAW).
These signals are supplied to both the inverted (pin 2) and non-inverted (pin 3) inputs of IC003 (a), where they are amplified.
The output of IC003 (a) at pin 1 produces a positive or negative blue shading correction signal which depends on the position of these controls and it is fed to the shading correction circuit on the process board.

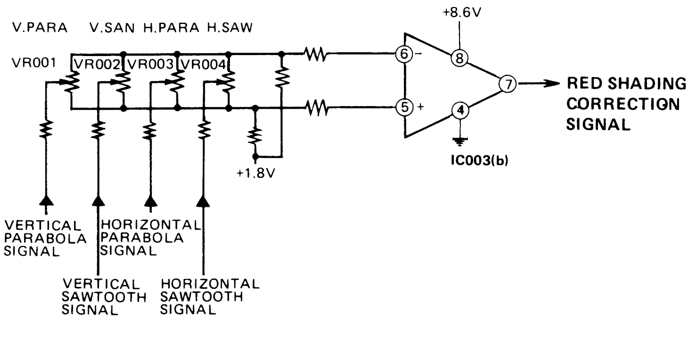

V.PARA
V.SAN
H.PARA
H.SAW
VR001
VR002
VR003
VR004
+8.6V
6
8
7
5
4
IC003(b)
RED SHADING CORRECTION SIGNAL
+1.8V
VERTICAL PARABOLA SIGNAL
HORIZONTAL PARABOLA SIGNAL
VERTICAL SAWTOOTH SIGNAL
HORIZONTAL SAWTOOTH SIGNAL

Fig. 5-5 Red Shading Correction Signal Generator Circuit

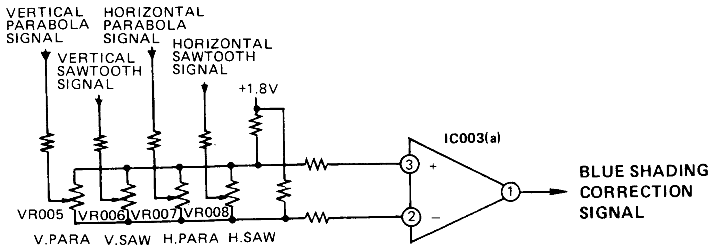

VERTICAL PARABOLA SIGNAL
HORIZONTAL PARABOLA SIGNAL
HORIZONTAL SAWTOOTH SIGNAL
VERTICAL SAWTOOTH SIGNAL
+1.8V
IC003(a)
3
1
2
BLUE SHADING CORRECTION SIGNAL
VR005
VR006
VR007
VR008
V.PARA
V.SAW
H.PARA
H.SAW

Fig. 5-6 Blue Shading Correction Signal Generator Circuit

6 Micro Processor Board (YFVPKD1001EA)

Contents

Page

6-1 Micro Processor 47

6-2 Input Interface 55

6-3 Character Generator 57

6-4 AIC amplifier 58

6-1 Micro Processor

Outline

The micro processor IC002 generates the programmed signals from the output ports of IC002 and receives these signals at the input ports of IC002 through the input interface circuits.

According to the input signals, the micro processor IC002 supplies the instructional signals to the character generator IC003 and also transmits or receives serial data from/to VTR for VTR remote control and displaying characters.

Serial data transmission

When the portable color video camera WVP-100 is used with the portable video cassette recorder NV-100, the serial data transmission system is performed between the both equipments through 10 pin connector.

The signals which are exchanged between the two equipments through 10 pin connector is as shown in Fig. 6-1-1.

Pin	CAMERA	DIRECTION
1	Video OUT (REC) Video IN (P.B)	VTR ↔ CAMERA
2	GND	VTR → CAMERA
3	Serial Data	VTR ↔ CAMERA
4	Serial Clock	VTR → CAMERA
5	STANDBY Ⓗ	VTR ← CAMERA
6	CAMERA PAUSE Ⓛ	VTR ← CAMERA
7	Audio OUT	VTR ← CAMERA
8	GND	VTR → CAMERA
9	GND	VTR → CAMERA
10	+12V	VTR → CAMERA

Fig. 6-1-1 10 pin Connector Signals

The serial clock signal is a reference signal which is used to control the timing of the data transmission between camera and VTR.

The serial clock is produced by VTR's micro processor and supplied to camera's micro processor IC002 as shown in Fig. 6-1-2.

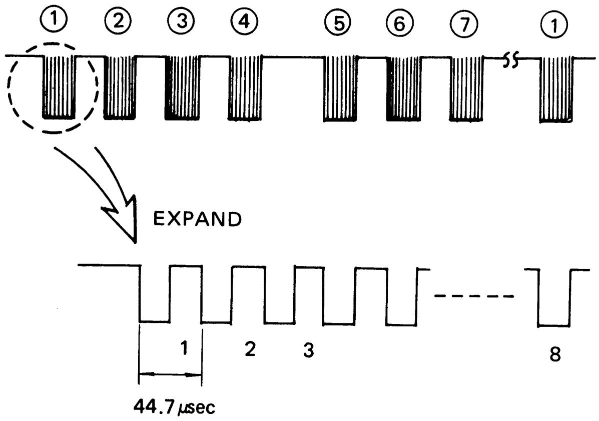


Fig. 6-1-2 Serial Clock

The serial clock has seven transmissions, and each transmission consists of 8 bit pulses.

During each transmission, the 8 bit serial data is exchanged as shown in Fig. 6-1-3.

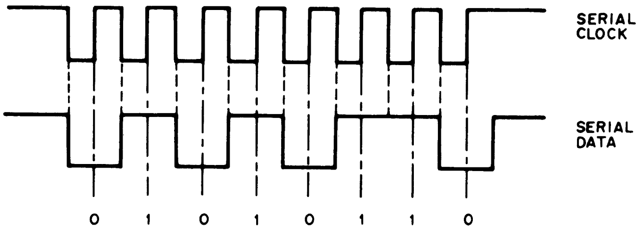


Fig. 6-1-3 Serial Data

The informations are converted into 8 bit logic data inside micro processor IC002. And for example, the coded data (Serial Data) is (0.1.0.1.0.1.1.0) and the timing chart between the serial data and the serial clock as shown in Fig. 6-1-3.

No.	DATA TRANSMISSION	
①	CAMERA → VTR	BATT, TAPE COUNT
②	TUNER → VTR	
③	WIRED REMOTE CONTROLLER → VTR	
④	INSIDE VTR	
⑤	VTR → CAMERA TUNER WIRED REMOCON	TAPE COUNT P.B REMOCON REC/P.B SELECT
⑥	VTR → CAMERA	
⑦	VTR → CAMERA	

Fig. 6-1-4 Serial data transmission

The following serial data is supplied from the VTR to the camera during the transmission (5), (6) and (7) as;

- Battery level
- Tape counter display (Number, Memory : M)

The following serial data is supplied from the camera to the VTR during the transmission (1) as;

- Tape counter control (Reset, Memory ON/OFF)
- Remote control of playback (PLAY, SLOW, CUE, REVIEW, INS)
- REC/Playback selection signal

Details

The specifications of the micro processor, IC002 is as follows;

- Package: 42 pins DIP Plastic
- Process: C MOS
- Power Supply Voltage: +5V (Standard)
- Command Cycle: 10 μs
- Commands: 75
- Instruction ROM: 2048 x 8 bits
- Data RAM: 128 x 4 bits
- Subroutine Stack: 2 Levels
- Counter/Timer: 8 bits
- Input: Parallel: 4 bits x 2 ports (AI port and BI port)
  Sens: 2 (SNS 0, SNS 1)
- Output: Parallel: 4 bits x 1 port (EO port) (With latch circuit)
  PLA*: 8 bits x 1 port (DO port)
  Discrete: 12 bits x 1 port (CO port)
- Initial Clear: Yes
- Clock Generator: Yes
- Assemble Support: Yes
- Hardware Simulation: Yes

Note * : PLA = Programmable Logic Array

The pin identifications and functions of the micro processor, IC002 is described in the Table 6-1.

Table 6-1 Pin Identification and Functions of Micro Processor, IC002

Pin No.	Name	Description	"H" ——►	"L" ——►	"H" ——►	"L" ——►
1	C07	Playback OSC Control out.	PLAYBACK	REC	PLAYBACK	REC
2	C06	Rec Reset out	REC	PLAYBACK (Reset)	REC	PLAYBACK (Reset)
3	C05	NTSC/PAL Setect out	PAL	NTSC	PAL	NTSC
4	C04	Not Used				
5	C03	Not Used				
6	C02	Playback Control out.	PLAYBACK	REC	PLAYBACK	REC
7	C01	Rec Control out	REC	PLAYBACK	REC	PLAYBACK
8	C00	"ADM" out	"H" : Direct Address Mode "L" : Address Increment Mode			
9	AI3	"REC" in	"START" (REC)	"PAUSE"	"START" (REC)	"PAUSE"
		"STANDBY" in	STANDBY	ON	STANDBY	ON
		"MARKSHIFT" in	MARKSHIFT	———	MARKSHIFT	———
		"NORMAL" in	NORMAL	———	———	———
		"MEMORY ON/OFF" in	MEMORY ON	———	MEMORY OFF	———
		"REVIEW" in	REVIEW	PLAY/PAUSE	REVIEW	PLAY/PAUSE
10	AI 2	"LOW LIGHT" in	LIGHT OK	LIGHT (Flashing)	LIGHT OK	LIGHT (Flashing)
		"AGC" in	AGC ON	AGC OFF	AGC ON	AGC OFF
		"P.B/REC" in	PLAYBACK	REC	PLAYBACK	REC
		"CHECK" in	A pattern	———	B pattern	———
		"DATE SET" in	N = N + 1	———	N = N + 1	———
		"TAPE COUNTER RESET" in	"0000"	———	———	———
		"CUE" in	CUE	PLAY/PAUSE	CUE	PLAY/PAUSE
11	AI 1	"WHITE BALANCE" in	WHITE OK	WHITE (Flashing)	WHITE OK	WHITE (Flashing)
		"FOCUS" in	AF ON	AF OFF	AF ON	AF OFF
		"TIMER START/STOP" in	START	———	LAP TIME	———
		INDOOR/OUTDOOR" in	INDOOR	OUTDOOR	INDOOR	OUTDOOR
		"DATE/TIMER" in	DATE	———	TIMER	———
		"TAPE COUNTER DELETE" in	DELETE	———	DISPLAY	———
		"PLAY" in	PLAY	———	PLAY/PAUSE	———

Pin No.	Name	Description	"H" →	"L" →	"H" →	"L" →
12	AI 0	"FADE" in	F	CANCEL F	CANCEL	CANCEL F
		"PLAY BACK" DC in	PLAYBACK	REC	PLAYBACK	REC
		"NEG/POS" in	NEGA	———	POSI	———
		"SLOW" in.	SLOW	PLAY/PAUSE	SLOW	PLAY/PAUSE
		"TIMER RESET" in	"0000.0"	———	———	———
		"INSERT" in	INS (Flashing)	———	INS (Flashing)	———
13	BI 3	V. SYNC" in	V. SYNC signal supplied.			
14	BI 2	"BATTERY WARNING 2" in				
15	BI 1	"BATTERY WARNING 1" in.				
16	NC	No Connection Inside.				
17	BI 0	Serial date in.				
18	EO 0	Scaning output for "REC" "LOW LIGHT" "WHITE BALANCE" "FADE" Output for "DA 4" (pin 6) of IC003.				
19	EO 1	Scaning output for "AGC", "FOCUS" Output for "DA 5" (pin 7) of IC003.				
20	EO 2	Output for "DA6" (pin 8) of IC003.				
21	EO 3	Output for "LD1" (pin 9) of IC003.				
22	TST	TEST in	Normally connect to Vss.			
23	RST	RESET in	———	RESET	———	RESET
24	CSLCT	COUNTER SELECT in	H : SNS 1 will be SENS INPUT L : SNS 1 will be COUNTER INPUT			
25	SNS 0	SENS in	SERIAL CLOCK signal supplied.			
26	SNS 1	SENS in 1/10 sec pulse input				
27	NC	No Connection Inside.				
28	DO 0	Scanning output for "MARKSHIFT", "DATE SET", "TIMER START/STOP", "TIMER RESET". Output for "DA 0" (pin 2) of IC003.				
29	DO 1	Output for "DA 1" (pin 1) of IC003.				
30	DO 2	Scanning output for "MEMORY ON/OFF", "TAPE COUNTER RESET", "TAPE COUNTER DELETE", "INSERT". Output for "DA 2" (pin 4) of IC003.				
31	DO 3	Scanning output for "REVIEW", "CUE", "PLAY", "SLOW". Output for "DA 3", (pin 5) of IC003.				
32	DO 4	Scanning output for "NORMAL", "CHECK", "DATE/TIME", "NEG/POS".				
33	DO 5	Scanning output for "STANDBY", "P.B/REC", "INDOOR/OUTDOOR", "PLAYBACK DC".				
34	DO 6	Scanning output for "NTSC/PAL" and "AIC DELETE".				
35	DO 7	SERIAL DATA output.				
36	Vcc	+4.8V in				
37	OSC	Oscillator in	1MHz clock pulse supplied.			
38	Vss	Connect to Ground.				
39	CO 11	INDICATOR INHIBIT out	REC	PLAYBACK	REC	PLAYBACK
40	CO 10	Not used				
41	CO 9	NEGA/POSI CONTROL out	POS	NEG	POS	NEG
42	CO 8	DISPLAY SPLIT out	"SPLIT ON"	"SPLIT OFF"	"SPLIT ON"	"SPLIT OFF"

Pin Identification and Function of Micro Processer, IC004

Pin No.	Name	Description	"H" ⟶	"L" ⟶	"H" ⟶	"L" ⟶
1	Vss	Connect to Ground.				
2	AI 3	V. SYNC signal supplied.				
3	AI 2	INDOOR/ OUTDOOR in	OUTDOOR	INDOOR	OUTDOOR	INDOOR
4	AI 1	DISPLAY SPLIT in	SPLIT ON	SPLIT OFF	SPLIT ON	SPLIT OFF
5	AI 0	NTSC/PAL SELECT in	PAL	NTSC	PAL	NTSC
6	EO 0	Not used.				
7	EO 1	DISPLAY SPLIT in	SPLIT ON	SPLIT OFF	SPLIT ON	SPLIT OFF
8	TST	TEST in				
9	RST	RESET in	——	RESET	——	RESET
10	SNS 0	H. SYNC signal supplied.				
11	Vcc	+4.8V in				
12	OSC	OSC in 1MHz clock pulse supplied.				
13	EO 2	Not used.				
14	EO 3	Not used.				
15	EO 4	Not used.				
16	CO 3	1/10 sec pulse output				
17	CO 2	AWC RESET out	RESET	——	RESET	——
18	CO 1	RESET out	——	RESET	——	RESET

The programmed signals (key scan pulse) are supplied from output ports DO0, DO2 - DO6, EO0 and EO1 to input interface circuits.

Then, these programmed signals are supplied from input interface circuits to input port AI0 - AI3 through diodes, switches and transistors. (Refer to 6-2, Input Interface)

According to the programmed signals at input port AI0 - AI3 and the signal at input port BI1 and BI2, the micro processor identifies the instruction with the signal flow route at input interface circuit and supplies the instructional signals (EO0 - EO3, DO0 - DO3) to character generator, IC003.

The serial clock pulse is supplied from VTR to pin 25 (SNS0) of IC002 to match the timing for data transmitting and receiving to/from VTR.

The serial data is fed from VTR to pin 17 (BI0) of IC002 so that the micro processor identifies the instruction from VTR. Also the serial data is sent from pin 35 (DO7) of IC002 to VTR through inverter Q005. (Fig. 6-1-5)

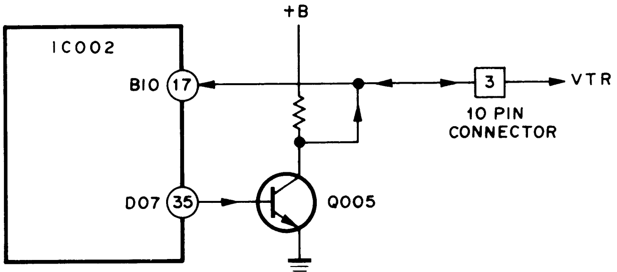


Fig. 6-1-5 Serial Data In/Out Circuit

The clock pulse (1/10 sec pulse) for the stopwatch function is always supplied from pin 16 (CO3) of IC004 to pin26 (SNS1) of IC002, even the camera is in the playback and standby-1 and 2 mode.

The V. sync pulse is fed from sync separation circuit on the deflection board to pin 13 (BI3) of IC002 to control the vertical timing.

The EVF display splitter is shown in Fig. 6-1-6.

When the characters are displayed both upper and lower portion of EVF screen at the same time, the display splitter circuit is functioned. Because the character generator IC003 which memory capacitance is only 5 line characters. Therefore the memory counter of IC003 stops by Q001 during the center portion of vertical period.

The EVF display split control signal is supplied from pin 42 (CO8) to the base of Q001 through IC004 for splitting the EVF display graphics into upper portion and lower portion. To split the EVF display, the vertical address counter of the character generator, IC003 is stopped at no graphic display area.

While the graphics is displayed, LOW signal is supplied from pin 7 (EO1) of IC004 to the base of Q001 so that Q001 is OFF and the H sync pulse is supplied from pin 10 of JA to pin 19 (H.SYNC) of IC003 so that the vertical address counter for EVF display is functioned.

While the graphics is not displayed, HIGH signal is supplied to the base of Q001 so that Q001 is ON and H sync pulse is not supplied to pin 19 (H.SYNC) of IC003 by grounding through Q001 so that the vertical address counter for EVF display is not functioned.

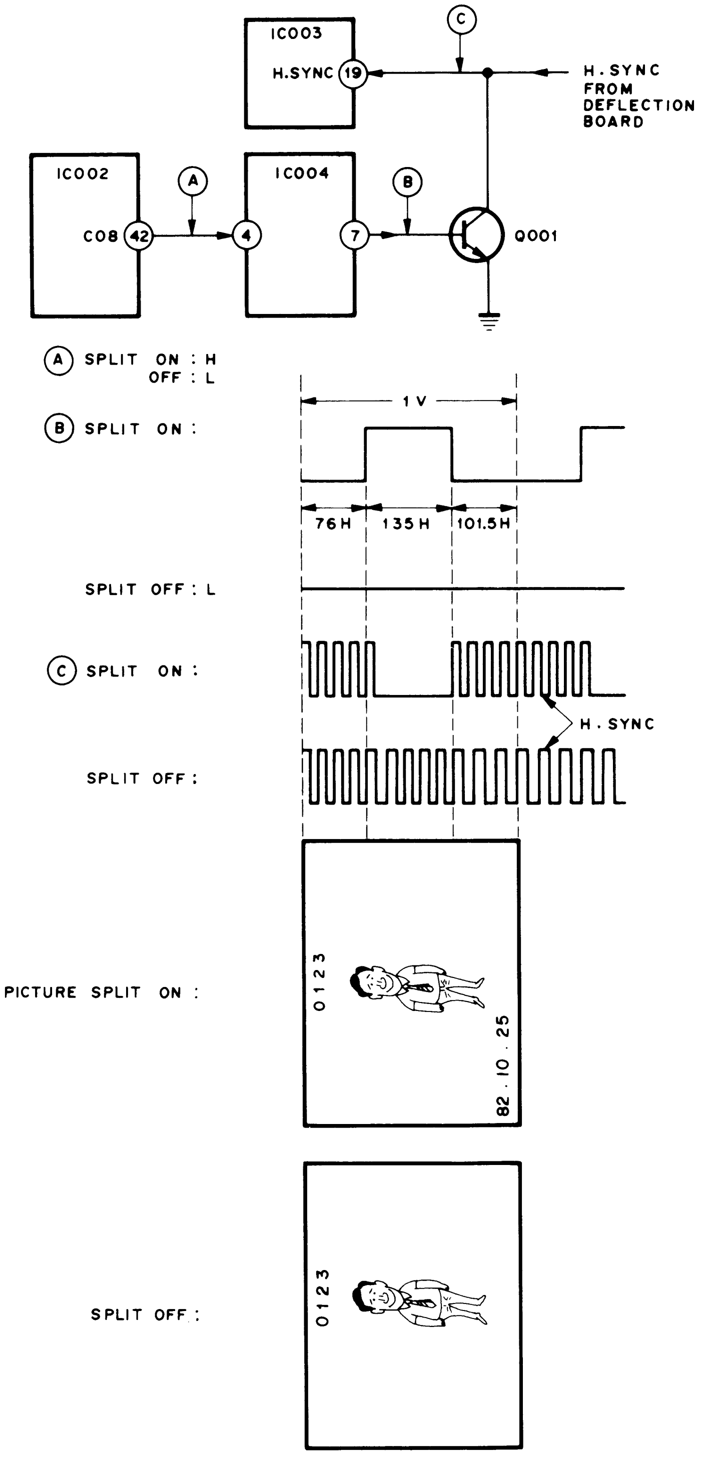


Fig. 6-1-6 EVF Display Splitter Circuit

The NTSC/PAL select signal is fed from pin 3 (CO5) of IC002 to pin 5 (AIO) of IC004 in order to change the scanning lines according to NTSC or PAL mode.

The osc control signal is applied from pin 1 (CO7) of IC002 to pulse generator circuit on process board so that the pulse generator is functioned during rec mode and is not functioned during playback mode. (Fig. 6-1-7)

The rec reset (fade reset) signal is sent from pin 2 (CO6) of IC002 to rec control circuit on process board so that fader mode is reset when the camera power ON, from standby to ON, insert ON and from playback to rec mode. (Fig. 6-1-8)

The playback control signal is supplied from pin 6 (CO2) of IC002 to PAL signal processing circuit on process board so that the camera PAL output signal is not obtained at PAL OUT on process board during playback mode. Also it is supplied to pin 2 of IC001 (AIC amp) through D002 in order to close the lens iris during playback mode. (Fig. 6-1-9)

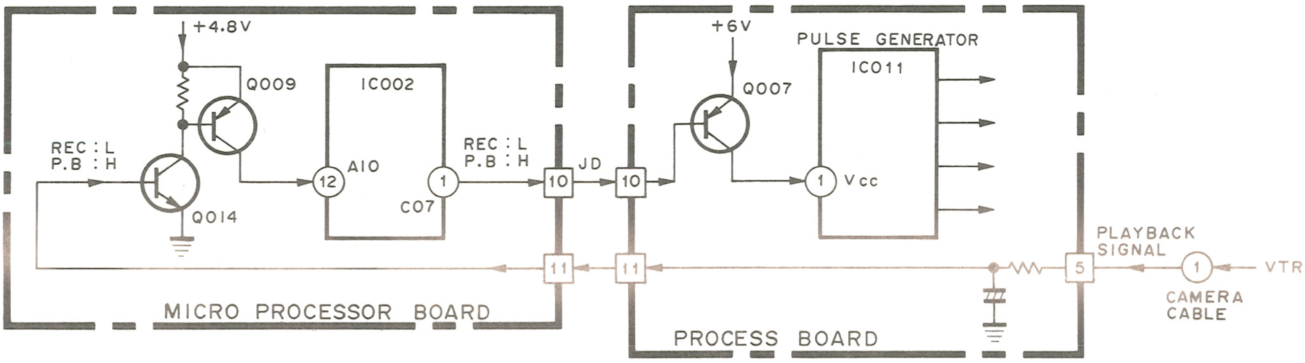

+4.8V
Q009
IC002
REC : L
P.B : H
Q014
AIO
12
1
CO7
REC : L
P.B : H
10
JD
10
11
11
MICRO PROCESSOR BOARD
+6V
PULSE GENERATOR
IC011
Q007
1
Vcc
PLAYBACK SIGNAL
5
1
VTR
CAMERA CABLE
PROCESS BOARD

Fig. 6-1-7 Playback OSC Control Circuit

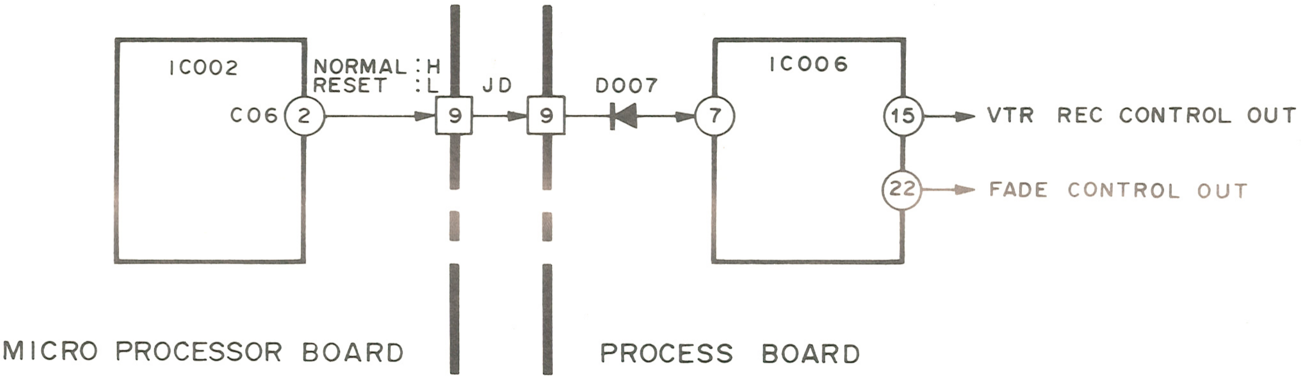

IC002
CO6
2
NORMAL : H
RESET : L
9
JD
9
D007
7
IC006
15
VTR REC CONTROL OUT
22
FADE CONTROL OUT
MICRO PROCESSOR BOARD
PROCESS BOARD

Fig. 6-1-8 Rec Reset Circuit

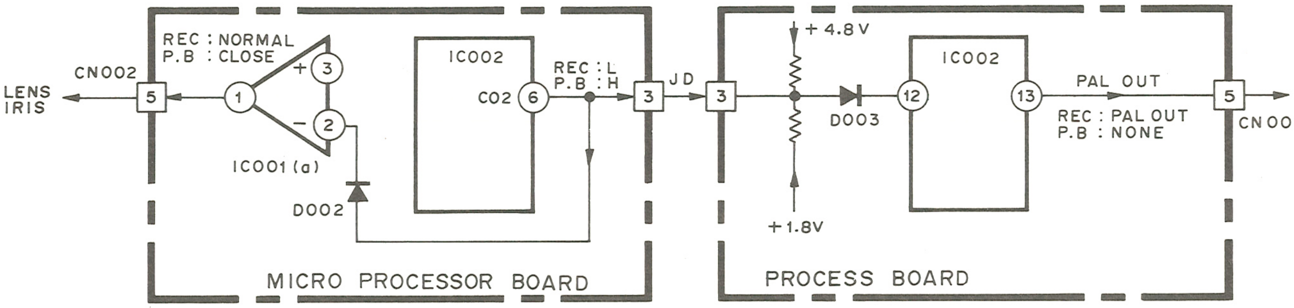

LENS IRIS
CN002
5
REC : NORMAL
P.B : CLOSE
1
3
2
IC001 (a)
D002
IC002
CO2
6
REC : L
P.B : H
3
JD
3
+4.8V
D003
+1.8V
12
IC002
13
PAL OUT
REC : PAL OUT
P.B : NONE
5
CN006
MICRO PROCESSOR BOARD
PROCESS BOARD

Fig. 6-1-9 Playback Control Circuit

The rec control signal is fed from pin 7 (CO1) of IC002 to rec control circuit on process board so that the VTR start/stop switch is not functioned during playback mode. (Fig. 6-1-10)

The indicator inhibit signal is sent from pin 39 (CO11) of IC002 to signal processing circuit on process board so that level indicator on viewfinder is disappeared during playback mode. In addition to this, the beam detect signal from deflection board is high (H) during playback mode. This high (H) resets the AWC (Automatic White balance setting Circuit). Therefore D017 pulls down the beam detect signal to low (L) so that the AWC is not reset during playback mode for remaining the AWC informations. (Fig. 6-1-11)

The NEGA/POSI control signal is applied from pin 41 (CO9) of IC002 to PAL signal processing circuit on process board so that the normal(positive) picture is appeared when camera is aimed to negative color film. (Fig. 6-1-12)

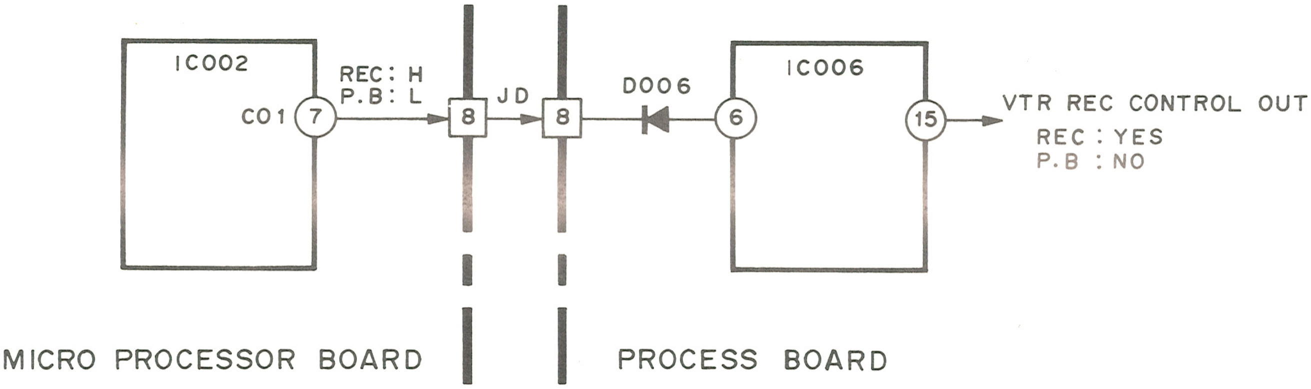

IC002
CO1
7
REC : H
P.B : L
8
JD
8
D006
IC006
6
15
VTR REC CONTROL OUT
REC : YES
P.B : NO
MICRO PROCESSOR BOARD
PROCESS BOARD

Fig. 6-1-10 Rec Control Circuit

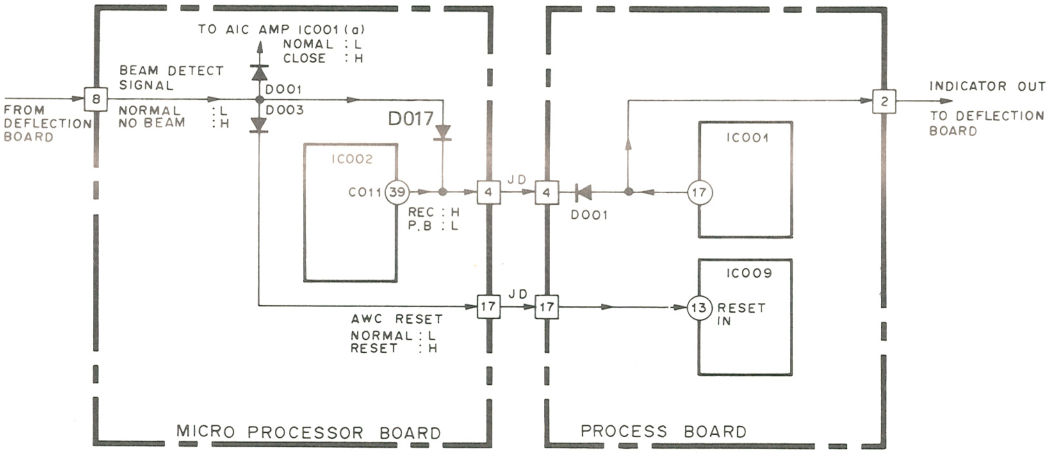

TO AIC AMP IC001 (a)
NOMAL : L
CLOSE : H
BEAM DETECT SIGNAL
FROM DEFLECTION BOARD
8
NORMAL : L
NO BEAM : H
D001
D003
D017
IC002
CO11
39
REC : H
P.B : L
4
JD
4
D001
IC001
17
INDICATOR OUT
2
TO DEFLECTION BOARD
IC009
13
RESET IN
17
JD
17
AWC RESET
NORMAL : L
RESET : H
MICRO PROCESSOR BOARD
PROCESS BOARD

Fig. 6-1-11 Indicator Inhibit Circuit

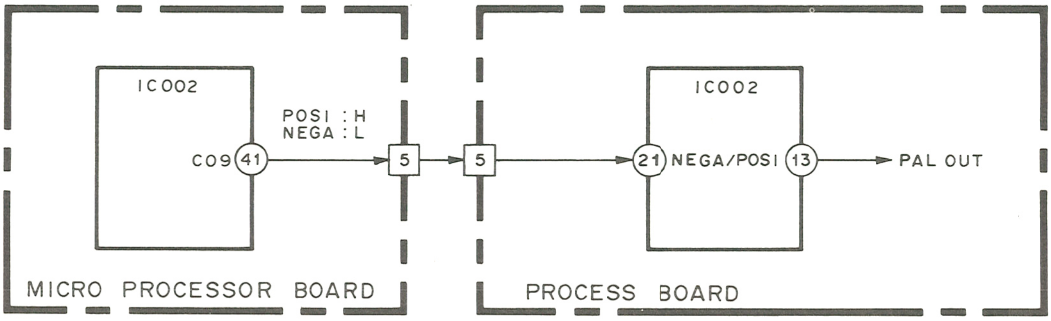

IC002
CO9
41
POSI : H
NEGA : L
5
5
IC002
21
NEGA/POSI
13
PAL OUT
MICRO PROCESSOR BOARD
PROCESS BOARD

Fig. 6-1-12 NEGA/POSI Control Circuit

The AWC (Automatic White balance setting Circuit) reset signal is supplied from pin 17 (CO2/RST2) of IC004 to AWC on process board through D004 in order to reset AWC whenever camera power is initially turned ON and INDOOR/OUTDOOR switch position is changed. Also the beam detect signal from deflection board is added to AWC reset signal so that AWC is not functioned during the beam current is insufficient. The reset pulse generator consisting of Q004 generates the negative polarity reset pulse and it is fed from the collector of Q004 to pin 9 (RST) of IC004 in order to make reset pulses at pin 17 (CO2/RST2) and 18 (CO1-/RST1) of IC004. (Fig. 6-1-13)

The clock pulse generator consisting of IC005 and X001 oscillates 4.0 MHz clock pulse and then it is counted down to 1 MHz clock pulse inside IC005.
The 1 MHz clock pulse is fed from pin 6 (O2) of IC005 to pin 37 (OSC) of IC002 and pin 12 (OSC) of IC004. (Fig. 6-1-14)

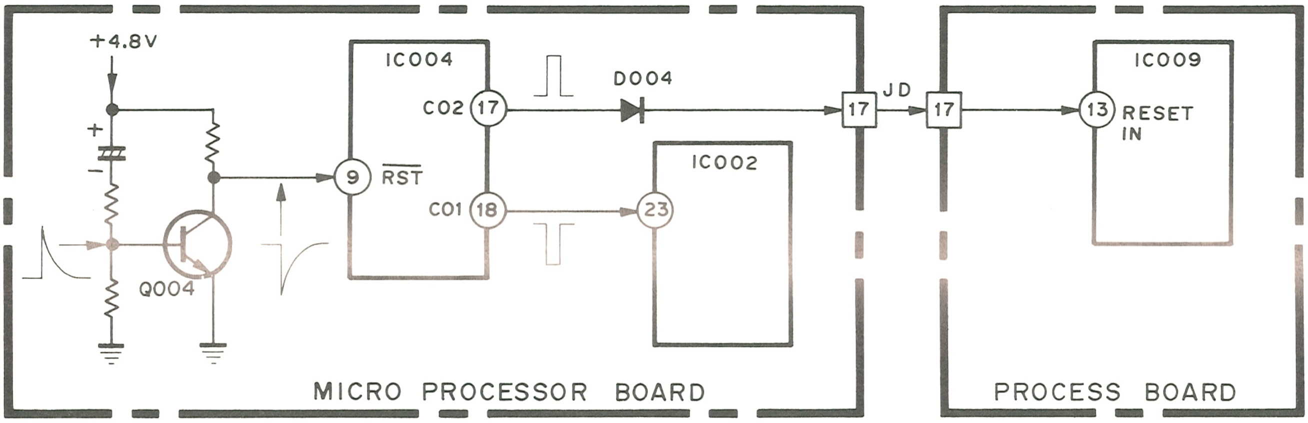

+4.8V
+
−
Q004
IC004
CO2
17
9
RST
CO1
18
D004
IC002
23
17
JD
17
IC009
13
RESET IN
MICRO PROCESSOR BOARD
PROCESS BOARD

Fig. 6-1-13 AWC Reset Circuit

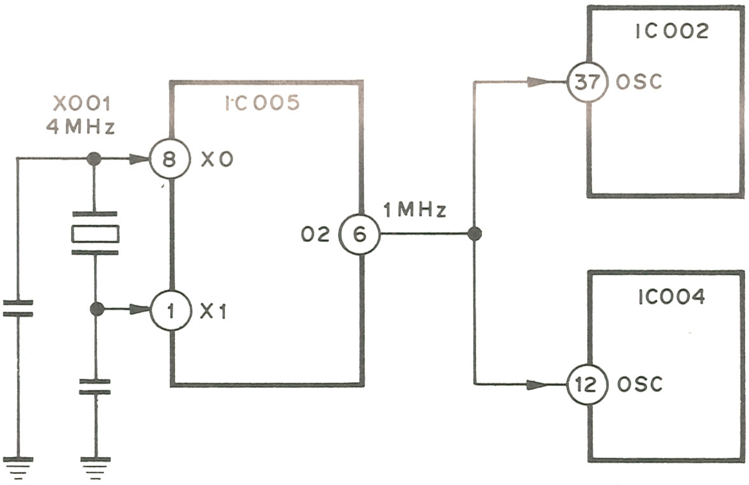

X001
4MHz
IC005
8
XO
1
X1
O2
6
1MHz
IC002
37
OSC
IC004
12
OSC

Fig. 6-1-14 Clock Pulse Generator

6-2 Input Interface

The input interface circuits consist of the three blocks as;

- EVF Display Board Circuit
- VTR Remote Control Board Circuit
- Camera Conditions Sensor Circuit

and these are constructed in the matrix circuit.

The output ports and input ports of the micro processor is incorporated with the matrix circuit as shown in the Fig. 6-2-1.

The programmed signals (key scan pulses) are supplied from the output ports DO0, DO2 - DO6 and EO0 - EO1 to the matrix circuit so that the programmed signals are returned to the input ports AI0 - AI3 through diodes-/switches, diodes and transistors in the matrix circuit. The micro processor, IC002 will know the function of the camera by detecting the returned programmed signal at the input ports AI0 - AI3.

The signals through diodes/switches are selected by operator's action as follows;

FROM	SW	TO	Camera's Function
DO0	SW002	AI0	TIMER RESET
DO0	SW003	AI1	TIMER START/STOP
DO0	SW003	AI2	DATE SET
DO0	SW002	AI3	MARK SHIFT
DO2	SW005	AI0	INSERT
DO2	SW006	AI1	TAPE COUNTER DELETE
DO2	SW005	AI2	TAPE COUNTER RESET
DO2	SW004	AI3	TAPE COUNTER MEMORY
DO3	SW004	AI0	SLOW
DO3	SW003	AI1	PLAY
DO3	SW002	AI2	CUE
DO3	SW001	AI3	REVIEW
DO4	SW007	AI0	NEG/POS PICTURE
DO4	SW001	AI1	DATE/TIMER
DO4	SW009	AI2	CHECK
DO4	SW008	AI3	NORMAL

The signals through transistors are selected by the electronic signals at the bases of transistors as follows;

FROM	TR	BASE OF TR	TO	Camera's Function
DO5	Q009	HIGH	--	REC
DO5	Q009	LOW	AI0	PLAYBACK
DO5	Q008	HIGH	--	OUTDOOR
DO5	Q008	LOW	AI1	INDOOR
DO5	Q007	HIGH	--	REC
DO5	Q007	LOW	AI2	PLAYBACK
DO5	Q006	HIGH	--	ON
DO5	Q006	LOW	AI3	STANDBY-1 and 2
EO0	Q013	LOW	AI0	FADE IN/OUT
EO0	Q012	HIGH	--	WHITE NG
EO0	Q012	LOW	AI1	WHITE OK
EO0	Q011	HIGH	--	LOW LIGHT
EO0	Q011	LOW	AI2	LIGHT OK
EO0	Q010	HIGH	--	REC.PLAY.PAUSE
EO0	Q010	LOW	AI3	REC.PLAY
EO1	Q016	HIGH	--	AF OFF
EO1	Q016	LOW	AI1	AF ON
EO1	Q015	HIGH	--	AGC OFF
EO1	Q015	LOW	AI2	AGC ON

According to the signals at the input ports of the micro processor, IC002, the micro processor supplies the graphics instructions to the character generator, IC003 and the remote control instructions to VTR.

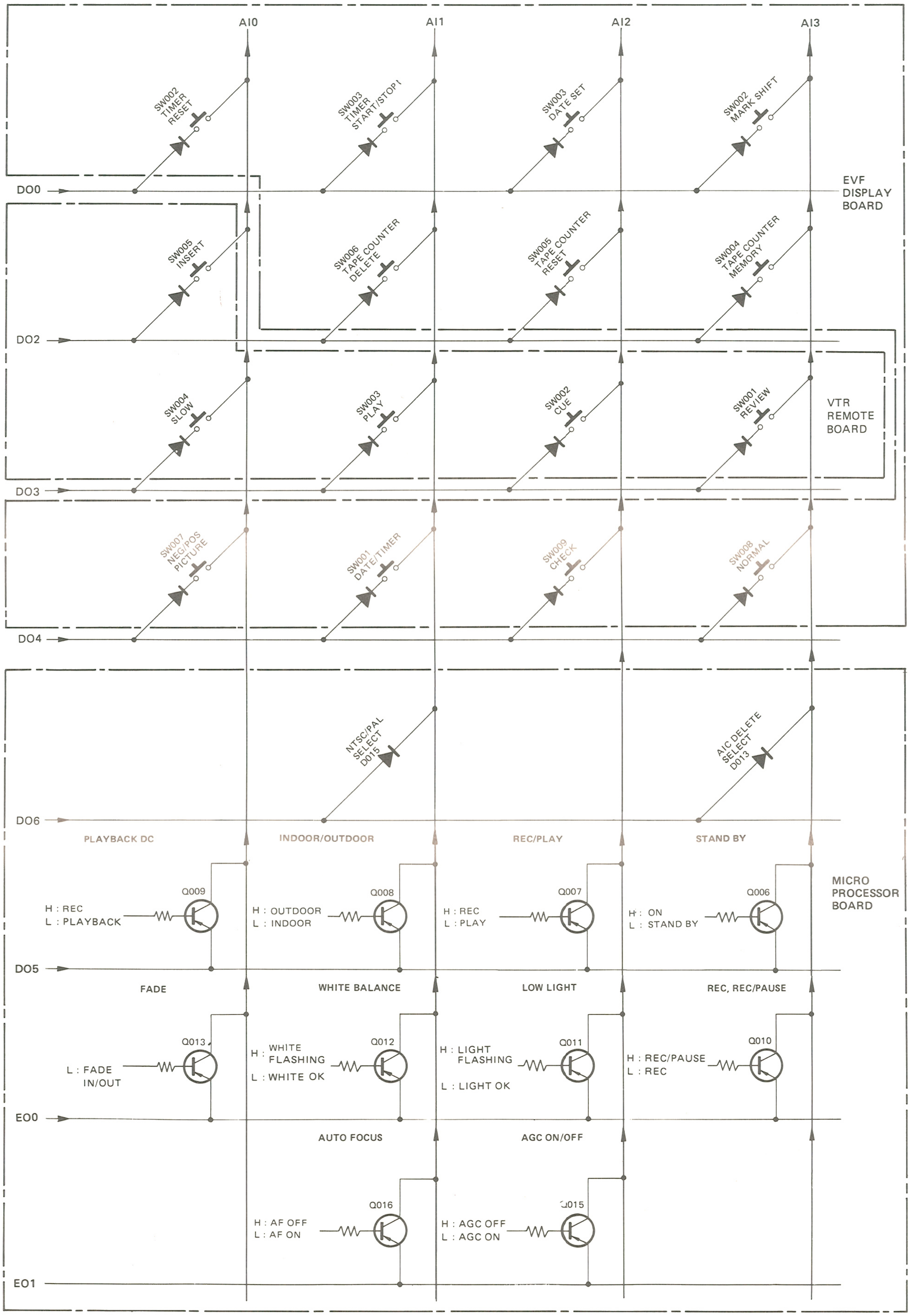

AI0
AI1
AI2
AI3
SW002 TIMER RESET
SW003 TIMER START/STOP
SW003 DATE SET
SW002 MARK SHIFT
DO0
EVF DISPLAY BOARD
SW005 INSERT
SW006 TAPE COUNTER DELETE
SW005 TAPE COUNTER RESET
SW004 TAPE COUNTER MEMORY
DO2
SW004 SLOW
SW003 PLAY
SW002 CUE
SW001 REVIEW
VTR REMOTE BOARD
DO3
SW007 NEG/POS PICTURE
SW001 DATE/TIMER
SW009 CHECK
SW008 NORMAL
DO4
NTSC/PAL SELECT D015
AIC DELETE SELECT D013
DO6
PLAYBACK DC
INDOOR/OUTDOOR
REC/PLAY
STAND BY
MICRO PROCESSOR BOARD
Q009
H : REC
L : PLAYBACK
Q008
H : OUTDOOR
L : INDOOR
Q007
H : REC
L : PLAY
Q006
H : ON
L : STAND BY
DO5
FADE
WHITE BALANCE
LOW LIGHT
REC, REC/PAUSE
Q013
L : FADE IN/OUT
Q012
H : WHITE FLASHING
L : WHITE OK
Q011
H : LIGHT FLASHING
L : LIGHT OK
Q010
H : REC/PAUSE
L : REC
EO0
AUTO FOCUS
AGC ON/OFF
Q016
H : AF OFF
L : AF ON
Q015
H : AGC OFF
L : AGC ON
EO1

Fig. 6-2-1 Input Interface Circuit

6-3 Character Generator

The pin identifications and functions of IC003 is described in Table 6-2.

Table 6-2 : Pin Identifications and Function of Character Generator IC003

Pin No.	Name	Description
1	Vss	Connect to Ground
2	DA0	Data input bus
3	DA1	Data input bus
4	DA2	Data input bus
5	DA3	Data input bus
6	DA4	Data input bus
7	DA5	Data input bus
8	DA6	Data input bus
9	LDI	Strobe pulse input
10	ADM	Address Mode Select pulse input
11	TST	Test input. Normally connect to Ground.
12	VDD	+4.8V input
13	VOW	Character output (positive polarity)
14	VOB	Not used
15	DO0	Not used
16	DO1	Not used
17	DO2	Not used
18	DO3	Not used
19	H.SYNC	H.SYNC input
20	V.SYNC	V.SYNC input
21	OSC 1	Clock pulse generator input
22	OSC 2	Clock pulse generator input

The clock pulse frequency of IC003 is adjusted by VR001 (CHARACTER SIZE).

The process for the display characters is shown in Fig. 6-3-1.

The display characters are separated into the two categories as;

(1) A : Cannot be recorded and only display on the EVF.

(2) B : Can be recorded and supplied to VTR recorder.

The character output (A + B) at pin 13 (VOW) of IC003 is supplied to pin 7 of flat cable JA so that the character output is supplied to pin 16 of IC005 on the deflection board through flat cable JA.

The character output (A + B) is separated into the graphics (A) and graphics (B) inside IC005 on the deflection board.

The graphics (B) is fed from pin 14 of IC005 on deflection board to process board and mixed with the video signal inside IC002 on the process board. Then PAL signal (video + B) is supplied from pin 13 of IC002 to VTR through pin 2 of CN006 on the process board. Also PAL signal (EVF video + B) is supplied from pin 13 of IC002 through the trap (CF004), pin 8 of flat cable JC pin 18 of IC005 on the deflection board.

The signal (EVF video + B) is mixed with the graphics (A) inside IC005 on the deflection board so that the signal (EVF video + B + A) is supplied from pin 24 of IC005 to viewfinder through pin 2 of CN005 on the deflection board.

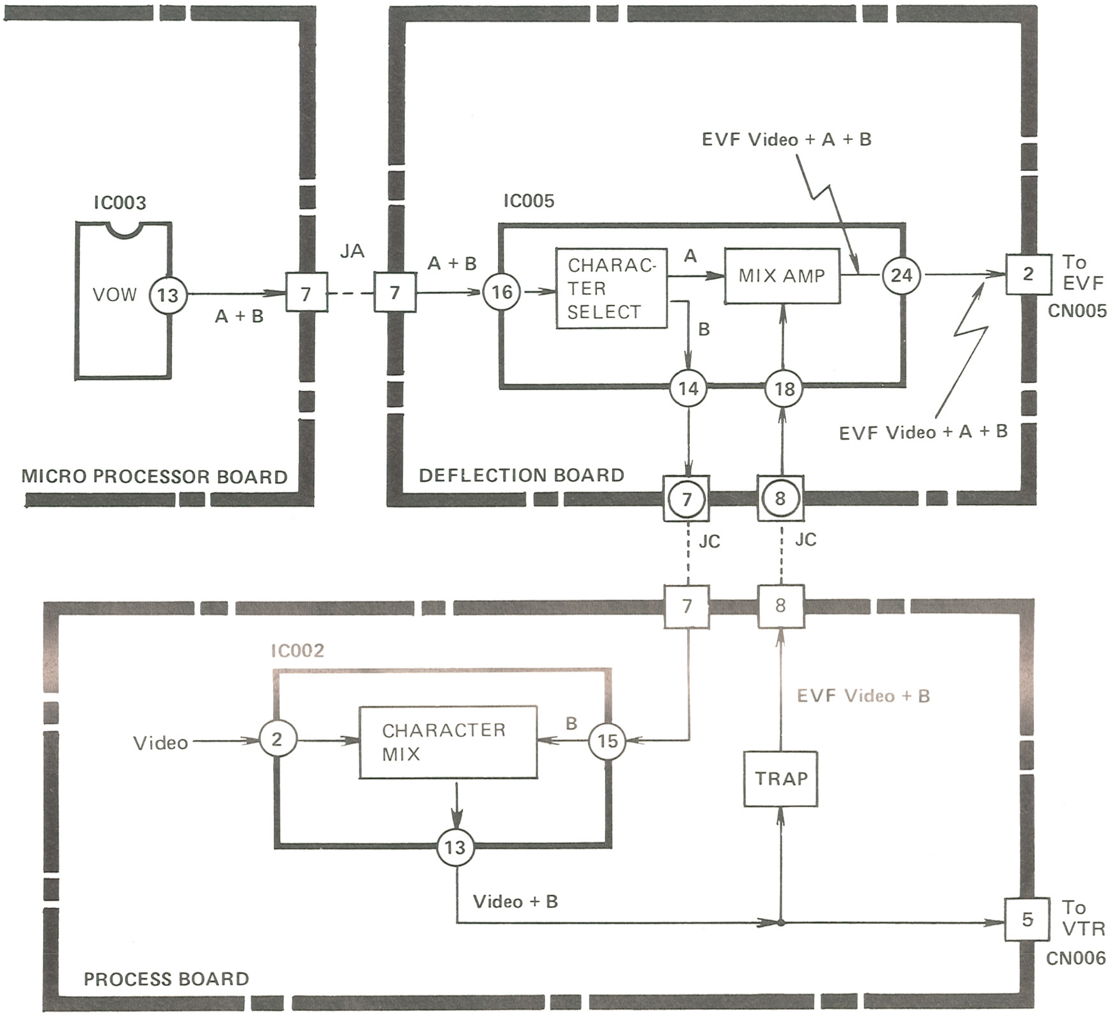

IC003
VOW
13
A + B
7
JA
7
A + B
MICRO PROCESSOR BOARD
IC005
16
CHARAC-TER SELECT
A
B
MIX AMP
24
14
18
EVF Video + A + B
EVF Video + A + B
2
To EVF
CN005
DEFLECTION BOARD
7
8
JC
JC
7
8
IC002
Video
2
CHARACTER MIX
B
15
13
EVF Video + B
TRAP
Video + B
5
To VTR
CN006
PROCESS BOARD

Fig. 6-3-1 Process of Display characters

6-4. AIC amplifier

Outline

The AIC amplifier receives AIC detect signal from process board and drives lens iris in order to keep video output level constant.

Detail

AIC amplifier consists of IC001(a) and IC001(b). The AIC detect signal is supplied from signal processing circuit on process board to pin 2 () of IC001 and amplified by IC001(a). Then it is sent from pin 1 of IC001 to drive coil of lens iris in order to open/close lens iris. In addition to this, the playback control signal from pin 6 (CO2) of IC002 and the beam detect signal from deflection board are fed to pin 2 of IC001 in order to close the lens iris during playback mode and the beam current is insufficient.

The induced voltage (it is occurred by moving lens iris inside the damper coil.) is fed from lens damper coil to pin 5 (+) of IC001 and amplified by IC001(b). Then amplified signal is fed from pin 7 of IC001 to pin 2 of IC001 to damp the lens iris hunting. (Fig. 6-4-1)

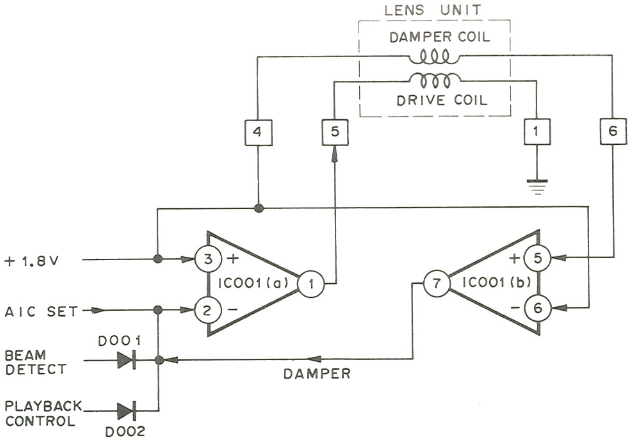

LENS UNIT
DAMPER COIL
DRIVE COIL
4
5
1
6
+1.8V
AIC SET
BEAM DETECT
PLAYBACK CONTROL
D001
D002
3 +
2 −
IC001(a)
1
7
IC001(b)
+ 5
− 6
DAMPER

Fig. 6-4-1 AIC Amplifier Circuit

* REC
** PLAY BACK
*** REC/PLAY BACK

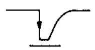
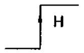
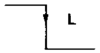
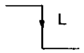
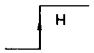
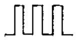
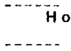
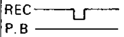
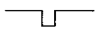
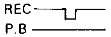
		***	***		*	**	***	***	***	***		
	INPUT MODE	CAMERA POWER SW	STANDBY SW		REC/PLAY SW		NV-100/OTHER MODEL SELECT		CAMERA REMOTE SW ON VTR			
		OFF → ON	ON → STANDBY	STANDBY → ON	PLAY → REC	REC → PLAY			CAMERA	NORMAL		
		INITIALISE	STANDBY-1	ON	REC/PAUSE	PLAY/PAUSE	NV-100	OTHERS				
OUTPUT MODE	INPUT PORT OUTPUT PORT	 RST	 $A_3 \cdot D_5$	 $A_3 \cdot D_5$	 $A_2 \cdot D_5$	 $A_2 \cdot D_5$	 SNS$_0$	 H or L SNS$_0$	B_0	B_0		
REC/FADE EF RESET	C06		L			L				L		
REC CONTROL	C01		H	H	H	H	H	H				
PIN⑥ OF CAM CABLE PAUSE CONT L: PAUSE H: RUN		L	L	L	L	L						
OSC CONT L: ON H: OFF	C07		H	L	L	H						
INDICATOR INHIBIT L: INHIBIT	C011			H	H	L						
P.B CONT L: REC H: P.B	C02			L	L	H						
NEGA/POSI L: NEG H: POS	C09			H	H	H						
PIN④ OF CAM CABLE TALLY L: REC PLAY H: OTHER			H	H	L	H				H		
PIN③ OF CAM CABLE SERIAL DATA OUT	D07	ACCORDING TO STANDBY SW	STANDBY CODE *OTHER CODES ARE INHIBITED	ACCORDING TO REC/PLAY SW	REC CODE	PLAY MODE CODE		H				
MONITOR DISPLAY		NO DISPLAY	NO DISPLAY	REC: NORMAL MODE PLAY: NO DISPLAY	NORMAL MODE	NO DISPLAY				CAMERA → NORMAL: "REMOTE" FLASHING		
REMARK			*ALL KEY INPUTS (EXCEPT STANDBY) ARE INHIBITED PIN ⑤ OF CAM CABLE + 3.0V ± 0.5V	PIN ⑤ OF CAM CABLE L and HI-Z			*BATTERY WARNING NV-100: BATT WARN SIGNAL IS FED FROM VTR OTHERS: BATT WARN SIGNAL IS DETECTED IN CAMARA *TAPE COUNTER NV-100: TAPE COUNTER SIGNAL IS FED FROM VTR. OTHERS: DISPLAY THE ACCUMULATIVE RECORDING TIME			*ALL KEY INPUTS ARE INHIBITED		

Table 6-3 Functions of Micro Processor (1)

INPUT MODE / OUTPUT MODE		* *				* *	* *	* *	* *	* *	* *
		INSERT				PLAY	PLAY · PAUSE	SLOW	PLAY · PAUSE	CUE	PLAY · PAUSE
		INSERT SW ON	VTR START/STOP SW ON	TAPE COUNTER BECOMES "OO OO M"	VTR STAR/STOP SW ON 2ND	PLAY SW ON 1ST	PLAY SW ON 2ND	SLOW SW ON	SLOW SW OFF	CUE SW ON	CUE SW OFF
		READY TO INSERT	INSERTING	CANCEL TO INSERT	CANCEL TO INSERT						
	INPUT PORT / OUTPUT PORT	H $A_0 \cdot D_2$	L $A_0 \cdot D_5$	H $A_0 \cdot D_5$	H $A_0 \cdot D_5$	H $A_1 \cdot D_3$	H $A_1 \cdot D_3$	H $A_0 \cdot D_3$	L $A_0 \cdot D_3$	H $A_2 \cdot D_3$	L $A_2 \cdot D_3$
REC/FADE FF RESET	C06	⊔	H	L	H	L	L	L	L	L	L
REC CONTROL	C01	H	H	H	H	L	H	H	H	H	H
PIN ⑥ OF CAM CABLE PAUSE CONT L: PAUSE H: RUN		L	H	L	L	H	L	L	L	L	L
OSC CONT L: ON H: OFF	C07	L	L	H	H	H	H	H	H	H	H
INDICATOR INHIBIT L: INHIBIT	C011	H	H	L	L	L	L	L	L	L	L
P.B CONT L: REC H: P.B	C02	L	L	H	H	H	H	H	H	H	H
HEGA/POSI L: NEG H: POS	C09										
PIN ④ OF CAM CABLE TALLY L: REC PLAY H: OTHER		L	L	H	H	H	H	H	H	H	H
PIN ③ OF CAM CABLE SERIAL DATA OUT	D07	SEND INSERT CODE 10 TIMES	PLAY MODE CODE	PLAY MODE CODE	PLAY MODE CODE	PLAY MODE CODE	PLAY MODE CODE	SLOW MODE CODE	PLAY MODE CODE	CUE MODE CODE	PLAY MODE CODE
MONITOR DISPLAY		"INS" FLASHING	"REC" "INS" FLASHING			*TAPE COUENTER RESET, MEMORY CAN BE ACCEPTED					
REMARK						*FROM PLAY TO SLOW, CUE, REV ARE ACCEPTED AND WHEN THEIR SWITCHES ARE RELEASED, VTR IS CHANGED TO PLAY/PAUSE.				*MEMORY ON AND TAPE COUNTER BECOMES "OOOOM" DURING CUE OR REV, VIR IS CHANGED TO PLAY/PAUSE MODE. *AFTER PLAY/PAUSE, "M" MARK IS DISPLAYING CONTINUE. AND CUE OR REV SW IS NOT ACCEPTED	

Table 6-3 Functions of Micro Processor (2)

INPUT MODE / OUTPUT MODE		* *		* * *		*	* * *				
		REVIEW	PLAY/PAUSE	PLAY BACK DC		NORMAL SW	TAPE COUNTER DELETE SW		TAPE COUNTER MEMORY SW		TAPE COUNTER RESET SW
		REV SW ON	REV SW OFF	PLAY BACK	REC		DELETE SW ON 1ST	DELETE SW ON 2ND	MEMORY SW ON 1ST	MEMORY SW ON 2ND	RESET SW ON
							DELETE	DISPLAY	ON	OFF	
	INPUT PORT / OUTPUT PORT	H $A_3 \cdot D_3$	L $A_3 \cdot D_3$	H $A_0 \cdot D_5$	L $A_0 \cdot D_5$	H $A_3 \cdot D_4$	H $A_1 \cdot D_2$	H $A_1 \cdot D_2$	H $A_3 \cdot D_2$	H $A_3 \cdot D_2$	H $A_2 \cdot D_2$
REC/FADE FF RESET	C06	L	L								
REC CONTROL	C01	H	H								
PIN ⑥ OF CAM CABLE PAUSE CONT L: PAUSE H: RUN		L	L								
OSC CONT L: ON H: OFF	C07	H	H	H	L	L					
INDICATOR IN HIBIT L: INHIBIT	C011	L	L	L	H	H					
P.B CONT L: REC H: P.B	C02	H	H	H	L	L					
NEGA/POSI L: NEG H: POS	C09										
PIN ④ OF CAM CABLE TALLY L: REC PLAY H: OTHER		H	H								
PIN ③ OF CAM CABLE SERIAL DATA OUT	D07	REV MODE CODE	PLAY MODE CODE						COUNTER MOMORY CODE	COUNTER MEMORY CODE	COUNTER RESET CODE
MONITOR DISPLAY						TAPE COUNTER "1 2 3 4"	TAPE COUNTER " " DELETE	TAPE COUNTER "1 2 3 4" DISPLAY	"1 2 3 4 M"	"1 2 3 4 "	"0 0 0 0"
REMARK											

Table 6-3 Functions of Micro Processor (3)

INPUT MODE / OUTPUT MODE										CHECK A PATTERN			
		REC · PLAY DISPLAY		FADER DISPLAY		CHECK DISPLAY		WHITE BALANCE		LOW LIGHT		INDOOR/OUTDOOR	
		START/STOP SW ON 1ST	START/STOP SW ON 2ND			CHECK SW ON 1ST	CHECK SW ON 2ND						
		REC · PLAY	REC · PAUSE			A PATTERN	B PATTERN						
	INPUT PORT / OUTPUT PORT	↑ H $A_3 \cdot E_0$	↑ H $A_3 \cdot E_0$	↑ H $A_0 \cdot E_0$	↓ L $A_0 \cdot E_0$	↑ H $A_2 \cdot D_4$	↑ H $A_2 \cdot D_4$	↑ H $A_1 \cdot E_0$	↓ L $A_1 \cdot E_0$	↑ H $A_2 \cdot E_0$	↓ L $A_2 \cdot E_0$	↑ H $A_1 \cdot D_5$	↓ L $A_1 \cdot D^5$
REC/FADE FF RESET	C06	H	H			H	H						
REC CONTROL	C01	H	H			H	H						
PIN ⑥ OF CAM CABLE PAUSE CONT L: PAUSE H: RUN		H	L										
OSC CONT L: ON H: OFF	C07	L	L	L	L	L	L						
INDICATOR INHIBIT L: INHIBIT	C011	H	H	H	H	H	H						
P.B CONT L: REC H: P.B	C02	L	L	L	L	L	L						
NEGA/POSI L: NEG H: POS	C09												
PIN ④ OF CAM CABLE TALLY L: REC PLAY H: OTHER		L	L										
PIN ③ OF CAM CABLE SERIAL DATA OUT	D07												
MONITOR DISPLAY		"REC"		"F"		BATTERY E - - - - - F LIGHT OK WHITE OK OUTDOOR	AGC ON AF ON	"WHITE OK"	"WHITE" FLASHING	"LIGHT OK"	"LIGHT" FLASHING	"INDOOR"	"OUTDOOR"
REMARK						*INHIBITED DURING REC·PLAY *CHANGED FROM REC·PLAY. PAUSE TO REC·PLAY, RETURN TO NORMAL MODE *MUST START A PATTERN WHEN PUSH CHECK SW FROM POWER ON, NORMAL, DATE/TIME AND NEG/POS.							

Table 6-3 Functions of Micro Processor (4)

INPUT MODE OUTPUT MODE		CHECK B PATTERN				CHECK A PATTERN				
		FOCUS		AGC		BATTERY WARNING A	BATTERY WARNING B			WARNING/ALARM
		AUTO	MAN	ON	OFF					
						NV-100	OTHERS			
	INPUT PORT OUTPUT PORT	↑ H $A_1 \cdot E_1$	↓ L $A_1 \cdot E_1$	↑ H $A_2 \cdot E_1$	↓ L $A_2 \cdot E_1$	B_0	$B_1 \cdot B_2$			B_0 OR B_1 --- L, B_2 --- L $A_1 \cdot E_0$ --- L $A_2 \cdot E_0$ --- L
REC/FADE FF RESET	C06									
REC CONTROL	C01									
PIN ⑥ OF CAM CABLE PAUSE CONT L: PAUSE H: RUN										
OSC CONT L: ON H: OFF	C07									
INDICATOR INHIBIT L: INHIBIT	C011									
P.B CONT L: REC H: P.B	C02									
NEGA/POSI L: NEG H: POSI	C09									
PIN ④ OF CAM CABLE TALLY L: REC PLAY H: OTHER										
PIN ③ OF CAM CABLE SERIAL DATA OUT	D07									
MONITOR DISPLAY		"AF ON"	"AF OFF"	"AGC ON"	"AGC OFF"	"E – – – – F" "E – – – F" "E – – F" "E – F" "E ↑ FLASHING	 "E – – – – F" "E – – – F" "E – – F" "E – F" ↑ FLASHING	B_1 H H L L	B_2 L H H L	PRIORITY ORDER (1) BATTERY (FLASHING) (2) REMOTE (FLASHING) (3) WHITE (FLASHING) (4) LIGHT (FLASHING)
REMARK										*ONLY BATTERY AND REMOTE ARE DISPLAYED AT PLAY BACK. *WARNING/ALARM ARE DISPLAYED ALL MODE EXCEPT CHECK MODE.

Table 6-3 Functions of Micro Processor (5)

OUTPUT MODE \ INPUT MODE		DATE/TIME		DATE SET	MARK SHIFT	TIMER START/STOP		TIMER RESET	NEGA/POSI	
		DATE/TIME SW ON 1ST	DATE/TIME SW ON 2ND			START/STOP SW ON 1ST	START/STOP SW ON 2ND		NEG/POS SW ON 1ST	NEG/POS SW ON 2ND
		DATE	TIME			START	STOP		NEGA	POSI
	OUTPUT PORT \ INPUT PORT	H $A_1 \cdot D_4$	H $A_1 \cdot D_4$	H $A_2 \cdot D_0$	H $A_3 \cdot D_0$	H $A_1 \cdot D_0$	H $A_1 \cdot D_0$	H $A_0 \cdot D_0$	H $A_0 \cdot D_4$	H $A_0 \cdot D_4$
REC/FADE FF RESET	C06	H	H						H	H
REC CONTROL	C01	H	H						H	H
PIN ⑥ OF CAM CABLE PAUSE CONT L: PAUSE H: RUN									L	L
OSC CONT L: ON H: OFF	C07	L	L						L	L
INDICATOR INHIBIT L: INHIBIT	C011	H	H						H	H
P.B CONT L: REC H: P.B	C02	L	L						L	L
NEGA/POSI L: NEG H: POS	C09								L	H
PIN ④ OF CAM CABLE TALLY L: REC PLAY H: OTHER									L	L
PIN ③ OF CAM CABLE SERIAL DATA OUT	D07				FLASHING ONLY THIS POSITION					
MONITOR DISPLAY		FLASHING "– " 00,00,00	"00 00.0" M S 1/10sec MAX 60MINUTES	⊔ , 0 ~ 9	⊟ - - - -	"0 0 0 0 . 1" START COUNTING	"0 1 2 3 . 4" · LAP TIME · CONTINUE COUNTING	"0 0 0 0 . 0"		
REMARK		*SET DATE WILL BE HELD UNLESS POWER OFF. *CURSOR ALWAYS START LEFT SIDE	*ALWAYS IT IS RESET WHEN MODE IS CHANGED	*DATE SET AND MARKSHIFT ARE INHIBITED DURING REC·PLAY. *MARK IS AUTOMATICALY DELETED DURING REC·PLAY.					*CHANGED FROM NEGA TO POWER OFF, STANDBY, NORMAL OR CHECK, ALWAYS POSI PICTURE APPEARED. *CAN BE CHANGED NEGA PICTURE ONLY. REC·PLAY·PAUSE MODE.	

Table 6-3 Functions of Micro Processor (6)

7 Auto Focus Board (YFES950-24A), (YFES950-24B) (YFES950-24C), (YFES950-24D)

CONTENTS

Page
7-1. General 65
7-2. Ultrasonic Transmission Circuit 66
7-3. Ultrasonic Echo-Reception Circuit 67
 7-3-1. Echo-Reception Circuit 67
 7-3-2. Variable Reference Voltage Circuit 68
7-4. Motor Driving Circuit 69
 7-4-1. Data Process in IC001 for Motor Driving Circuit.................................. 69
 7-4-2. Lens Position Sensor........................... 69
 7-4-3. Motor Driving Circuit 70
7-5. Supporting Circuit 71
 7-5-1. Regulators/Power Supply................... 71
 7-5-2. Thermal Correction Circuit 71
 7-5-3. Interface Circuit 71

7-1 General

This Auto Focus system is utilizing a ultrasonic to measure the time between the objects and camera and controls the lens focus automatically.

The time represents the distance between the camera-/lens and object.

All functions of this Auto Focus system are controlled by the MPU (Micro Processor Unit).

The system primary consists of the four blocks as;

(1) Ultrasonic Transmission Circuit
(2) Ultrasonic Echo-Reception Circuit
(3) Lens Motor Driving Circuit
(4) Supporting Circuits

The functional block diagram of the Auto Focus system is shown in Fig. 7-1-1.

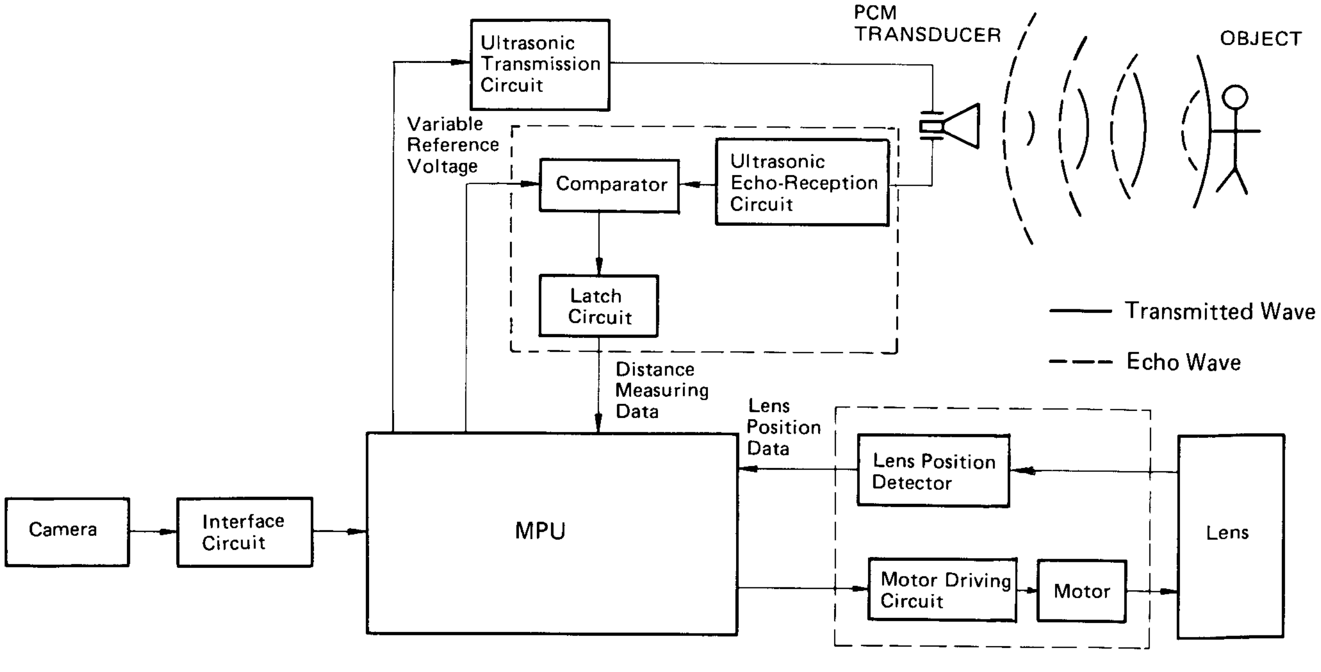
The transmission circuit transmits the 70KHz pulsed ultrasonic from the PCM (Piezo Ceramic Material) transducer when the timing pulse is provided from IC001.

The ultrasonic echo-reception circuit receives the echo from the objects at the transducer and amplifies the echo signal for the comparison with the variable reference voltage.

The echo level at the transducer is almost in inverse proportion to the distance/time so that the echo level from the near object is stronger and for the far object is weaker if the ultrasonic echo level is compared with the specified reference voltage.

This means that the sensitivity for the near object is overleveled and for the far object is not enough for the echo-reception circuit.

This Auto Focus system is primary designed to response human being so that the echo level from human being is varied according to the distance and is set to be higher than the reference voltage which is varied per echo distance/time to the object as shown in Fig. 7-1-2.



Ultrasonic Transmission Circuit
PCM TRANSDUCER
OBJECT
Variable Reference Voltage
Comparator
Ultrasonic Echo-Reception Circuit
Latch Circuit
Transmitted Wave
Echo Wave
Distance Measuring Data
Lens Position Data
Lens Position Detector
Camera
Interface Circuit
MPU
Lens
Motor Driving Circuit
Motor

Fig. 7-1-1 Functional Block Diagram of Auto Focus System

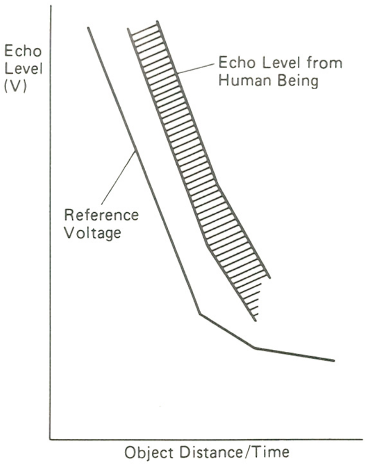


Fig. 7-1-2 Echo Level and Reference Voltage

The echo level and the variable reference voltage is compared by the comparator.

The output of the comparator is supplied to IC001 after the output is holding by the latch circuit.

IC001 measures the time which the ultrasonic is transmitted and received from/on the transducer, and calculates the distance between the camera and the object based on the wave speed of the ultrasonic.

IC001 detects the lens focus position and instructs the motor driving circuit to activate the motor for turning focus ring to the desired position.

7-2 Ultrasonic Transmission Circuit

Outline

This circuit generates the ultrasonic and transmits the ultrasonic from the transducer.

Details

The clock pulse for IC001 is generated by 400KHz ceramic oscillator circuit consisting of X001, R034, C019 and C020.

The 380 μs timing pulse is generated at pin 10 of IC001 during the vertical blanking period.

The 3 ms pulse at pin 11 of IC001 is supplied to pin 5 of IC006 and the ultrasonic is generated during the 3 ms pulse period by the 70KHz oscillator circuit consisting of IC006(b), IC005(a) and IC005(b) as shown in Fig. 7-2-1.

The frequency of generated ultrasonic is adjusted by VR003 (70KHz ADJ) to 70KHz.

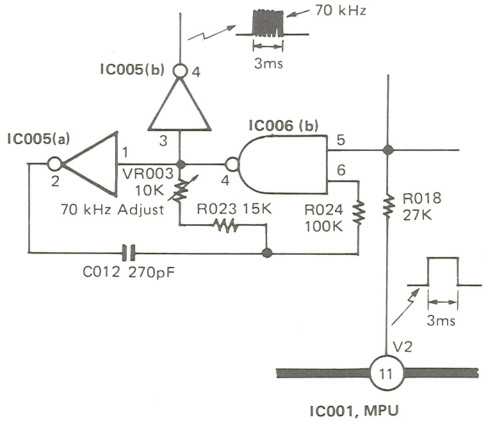


Fig. 7-2-1 Ultrasonic Generator

The ultrasonic Transmission circuit is shown in Fig. 7-2-2.

To reduce the pulsed audio noise from generating the ultrasonic, the trapezoid pulsed ultrasonic is transmitted.

The 380 μs timing pulse at pin 10 of IC001 is supplied to the base of Q017.

The pulse at the collector of Q017 is integrated by R070 and C039 to make trapezoid at the collector of Q018.

The trapezoid pulse is rounded its corner by R073 and C031 and amplified by Q019 and Q020.

The pulsed ultrasonic at pin 4 of IC005 is provided to Q005 through buffer Q004. Q005 is switching ON and OFF by the pulsed ultrasonic and the pulsed ultrasonic is built up during trapezoid period at the primary of T001.

The amplitude of the trapezoid pulsed ultrasonic at the secondary of T001 is approx. 160 - 180Vp-p which is transmitted from the PCM transducer through D004 and D005.

D004 and D005 cut the level less than 0.7V so that the induced noise of T001 is cut for improving the noise figure of the echo reception circuit during receiving period.

When the trapezoid pulsed ultrasonic is transmitted, the current approx. 1 - 2 amperes is passed through T001 and creates the noises which are not observed, because the trapezoid pulsed ultrasonic is transmitted during the vertical blanking period.

To prevent the effects on the other circuits, the separate regulated power supplies are used.

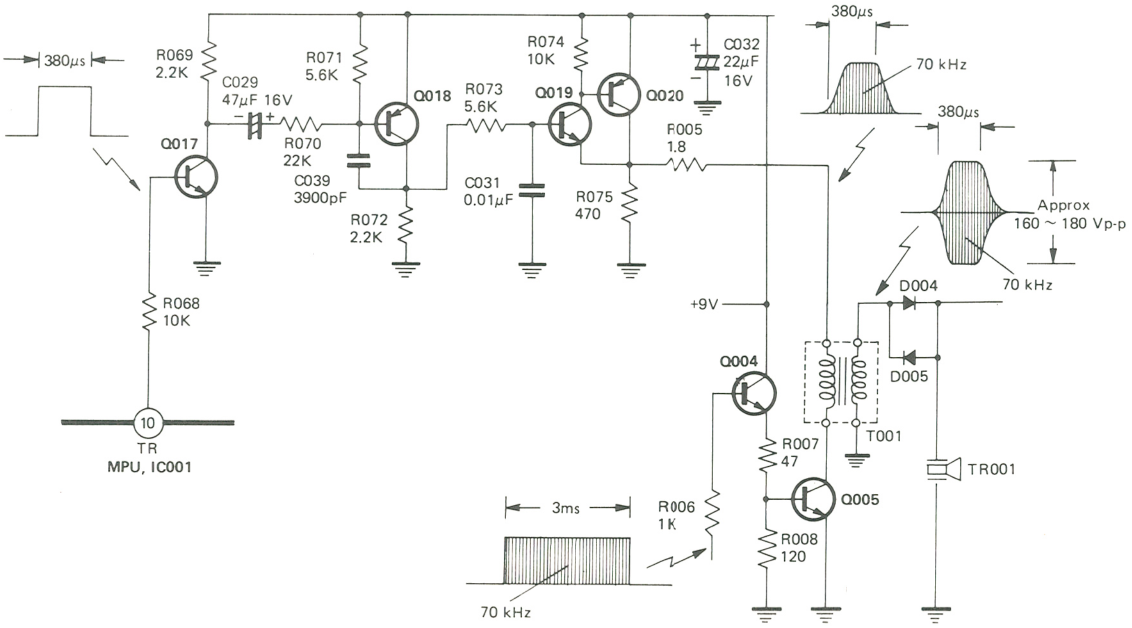

380µs
R069
2.2K
C029
47µF 16V
R071
5.6K
Q018
R073
5.6K
R074
10K
Q019
Q020
C032
22µF
16V
380µs
70 kHz
380µs
Q017
R070
22K
C039
3900pF
C031
0.01µF
R075
470
R072
2.2K
R005
1.8
Approx
160 ~ 180 Vp-p
70 kHz
D004
R068
10K
+9V
Q004
D005
T001
10
TR
MPU, IC001
R007
47
TR001
Q005
3ms
R006
1K
R008
120
70 kHz

Fig. 7-2-2 Ultrasonic Transmission

7-3 Ultrasonic Echo-Reception Circuit

Outline

This circuit receives the echo at transducer and it is sent to IC001 after comparing with the reference voltage and IC001 calculates the time/distance between the lens-/camera and the object.

Details

7-3-1 Echo-Reception Circuit

The echo is received at transducer after several msec from the transmission and the echo level is in inverse proportion to the distance from the lens/camera and the object.

Due to the very low echo level at the transducer, the gain of the echo-reception circuit is approx. 100dB and the echo-reception circuit is shown in Fig. 7-3-1.

R009 and C003 are for matching impedance with T001.

D006 and D007 cut off the level more than 0.7V for preventing excessive input at the pin 2 of operational amplifier IC002.

The echo at the transducer is supplied to pin 2 of IC002 and is amplified by IC002 and Q006. The amplifier gain of the echo-reception circuit is adjusted by VR001 (GAIN).

L001 is the resonance 70KHz band pass filter for improving the signal to noise ratios at 70KHz.

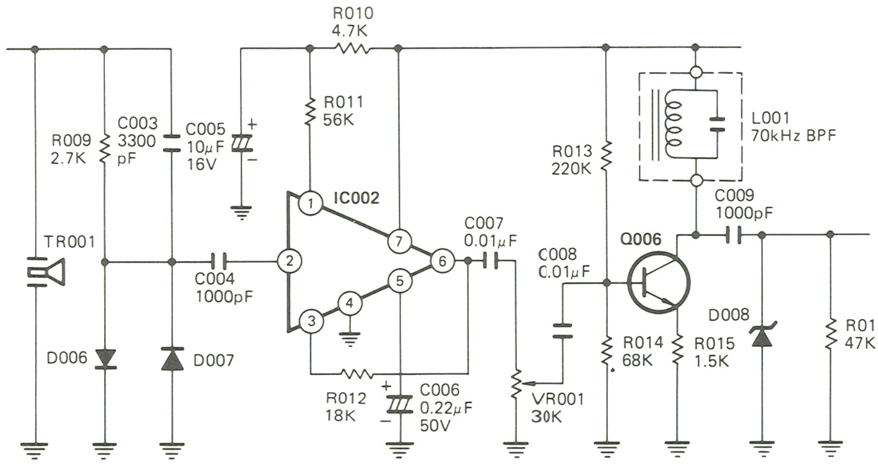

R010
4.7K
R011
56K
C003
3300
pF
C005
10µF
16V
R009
2.7K
IC002
L001
70kHz BPF
R013
220K
C009
1000pF
TR001
C007
0.01µF
C008
0.01µF
Q006
C004
1000pF
1
2
3
4
5
6
7
D008
D006
D007
R014
68K
R015
1.5K
R016
47K
R012
18K
C006
0.22µF
50V
VR001
30K

Fig. 7-3-1 Ultrasonic Echo Reception Circuit

The comparator, the reference voltage and the latch circuit are shown in Fig. 7-3-2.

D008, 5V zener prevents the excessive input to be supplied to comparator IC003.

The output is provided at pin 7 of IC003 when the echo level at pin 5 of IC003 becomes higher than the variable reference voltage at pin 6.

To hold the output at pin 7 of IC003, the flip-flop latch circuit, IC006(c) and IC006(d) is functioned after reset pulse is provided at pin 8 of IC006(c) from pin 20 of IC001.

The hold level of the F.F. latch is supplied to pin 21 of IC001. The reset pulse is provided after approx. 4ms from the starting time of the ultrasonic transmission so that the latch circuit is not functioned during transmitting period.

IC001 calculates the time period/distance between the starting time of 380 µs transmitting timing pulse and the starting time of the holding echo at the pin 10 of IC006. This time period represents the distance of the object from the lens/camera.

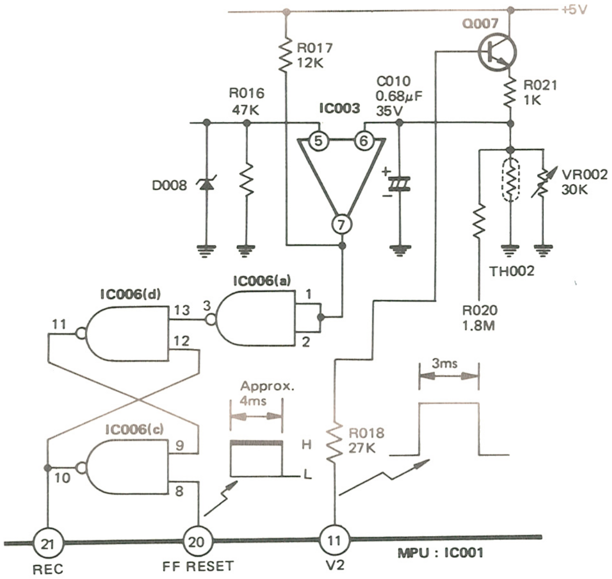

+5V
Q007
R017
12K
R016
47K
C010
0.68µF
35V
IC003
R021
1K
5
6
7
D008
VR002
30K
TH002
IC006(d)
IC006(a)
13
3
1
11
12
2
R020
1.8M
3ms
Approx.
4ms
IC006(c)
9
10
8
H
L
R018
27K
21
20
11
REC
FF RESET
V2
MPU : IC001

Fig. 7-3-2 Comparator Reference Voltage and Latch Circuits

7-3-2 Variable Reference Voltage Circuit

C010 is charged by Q007 which is functioned during the 3ms pulse width at the base of Q007.

The voltage at C010 represents the variable reference voltage at pin 6 of IC003 and is reduced after the 3ms pulse at the base of Q007 according to the slant line which is determined by the time constant consisting of C010, R021, VR002 and TH002 and is adjusted by VR002. (REF. V. SET)

The variable reference voltage is designed to set the approx. 10dB lower than the human being echo signal for the optimum emission angle and effective distance (See Fig. 7-1-2 in page 66).

The timing chart for the transmission and the echo-reception is shown in Fig. 7-3-3.

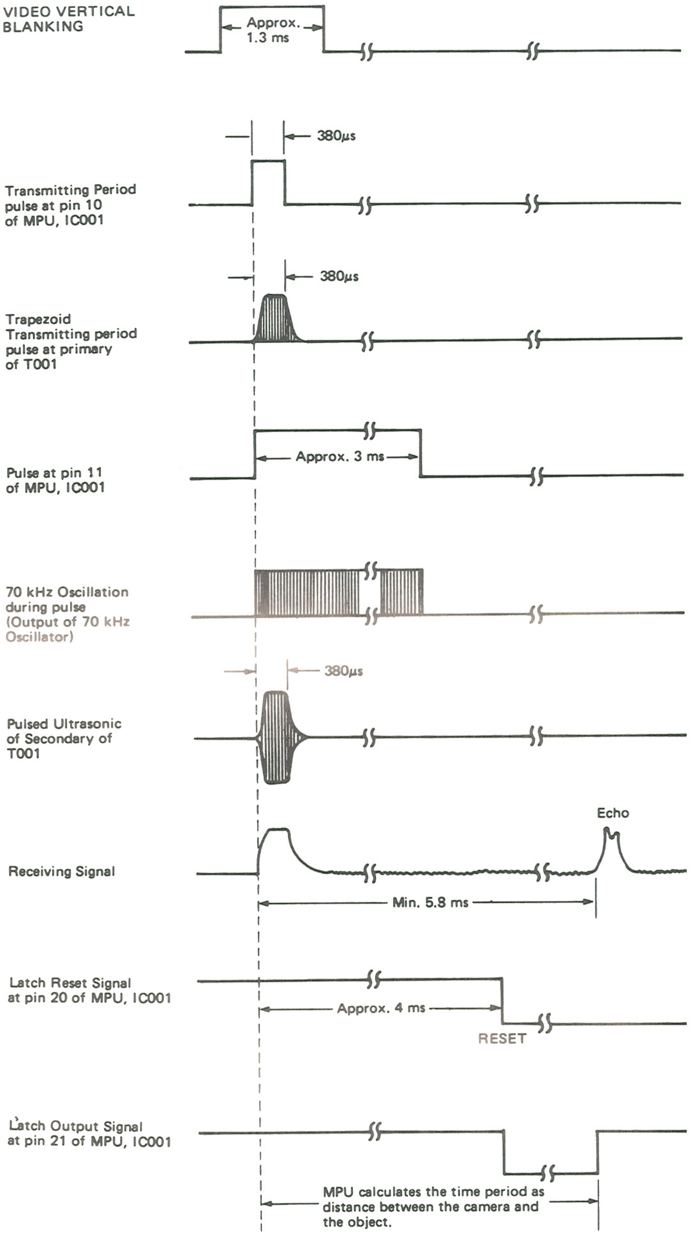

VIDEO VERTICAL BLANKING
Approx. 1.3 ms
380µs
Transmitting Period pulse at pin 10 of MPU, IC001
380µs
Trapezoid Transmitting period pulse at primary of T001
Pulse at pin 11 of MPU, IC001
Approx. 3 ms
70 kHz Oscillation during pulse (Output of 70 kHz Oscillator)
380µs
Pulsed Ultrasonic of Secondary of T001
Echo
Receiving Signal
Min. 5.8 ms
Latch Reset Signal at pin 20 of MPU, IC001
Approx. 4 ms
RESET
Latch Output Signal at pin 21 of MPU, IC001
MPU calculates the time period as distance between the camera and the object.

Fig. 7-3-3 Timing Chart for Measuring Time/Distance

7-4 Motor Driving Circuit

Outline

This circuit detects the position of the lens motor-/current lens position of the focus ring and provides the informations to IC001.

IC001 processes the informations of the echo signals and the lens positions, and activates the lens motor driving circuit to rotate the focus ring for the desired position.

Details

7-4-1 Data Process in IC001 for Motor Driving Circuit

Considering the external disturbances such as a metallic noise, telephone bell and clock bell etc, or the camera operations under bad conditions, the auto focus might be misoperationed whenever the auto focus is responded for each echo signal.

To avoid the misoperation, IC001 has the 6 registers for storing 6 distance-data.

When the 7th data is input into IC001, the 1st stored register data is shifted off.

IC001 always stores 6 data in the 6 registers as shown in Fig. 7-4-1.

IC001 checks the 6 data and neglects the data which is excessively different from other levels.

The similar data is shown with the asterisk mark in Fig. 7-4-1, for example.

IC001 makes the average of four data, 15, 14, 15 and 16 in the 1st status as 15 and activates the focus motor to be 15 lens point.

When the new echo/data is input as 12 lens point, IC001 makes the average of four data, 12, 15, 14 and 15 in the 2nd status as 14 lens point and activates the focus motor to be 14 lens point.

In this way, the misoperation is avoided and the auto focusing is not responded when the external disturbances occur or something is rapidly crossed in front of the camera/lens.

When the camera is aimed at the fixed object, the 6 distance data may be same. When more than 3 data of 6 are the same, the transmission interval becomes 0.3 sec by force to save the power consumptions.

7-4-2 Lens Position Sensor

This sensor detects the current position of the lens focus ring which has the gray codes pattern with 7 brush contacts around the focus ring.

The part of the gray codes pattern is shown in Fig. 7-4-2.

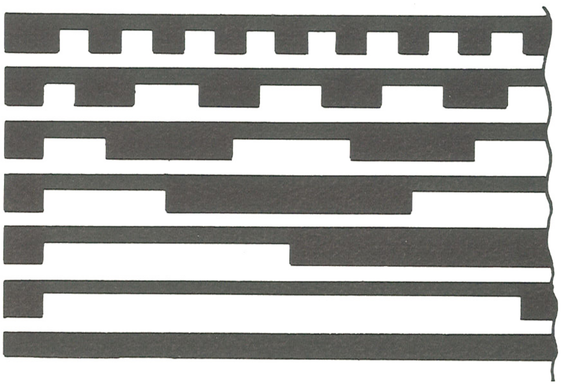


Fig. 7-4-2 Gray Codes Pattern for Lens Position Detector

The effective focus range is divided into 64 lens points and the gray codes for this 64 lens points are shown in Fig. 7-4-3.

The numbers 1-6 of the first column in Fig. 7-4-3 is corresponded with the numbers of the connector for the focus ring position sensor in the schematic diagram. In order to eliminate the ambiguity of the number, the gray codes change only one bit when the number moves one to the next.

When the brush contact is open, the level of the contact position is HIGH (+5V) and the bit is 1 .

When the brush contact is close, the level of the contact position is LOW (0V) and the bit is 0 .

C013 is used for noise protection.

The binary codes for focus ring position is provided at pin 2 - 7 of IC001 from focus ring position sensor, then IC001 has the information of the focus ring position so that IC001 detects the lens focus position.

The binary codes for the lens position is provided at pins 2 - 7 of IC001 from the lens position sensor, then IC001 has the information of the lens position, so that the IC001 detects the lens focus position.

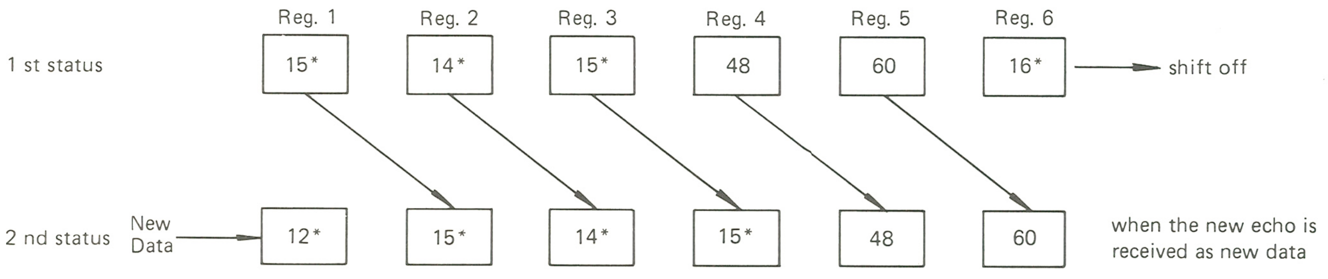


Fig. 7-4-1 6 Register/Data in MPU

	1 m						1.2 m											1.5 m													2.0 m	
	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
1	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0
2	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0
3	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0
4	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

											3.0 m									5.0 m						9.7 m						∞
	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0
2	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0
3	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0
4	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fig. 7-4-3 Output Informations of Encoder for Position of Lens Focus Ring
(Gray Codes) : 1 : High (Open Contact)
0 : Low (Close Contact)

7-4-3 Motor Driving Circuit

Auto Focus Mode

- **For clockwise rotation (FAR) :**

The +5V DC is supplied from pin 16 of IC001 to the base of Q013 so that Q013 and Q015 are ON for rotating focus motor, until the focus ring becomes desired position.

- **For counterclockwise rotation (NEAR) :**

The +5V DC is supplied from pin 17 of IC001 to the base of Q016 so that Q016 and Q012 are ON for rotating focus motor, until the focus ring becomes desired position.

Power Focus Mode (using Camera Remote Control unit)

In order to rotate the focus ring slowly, the pulse (which has high level in 1 vertical period and low level in 2 vertical period) is supplied from pin 16 or 17 of IC001 instead of the +5V DC.

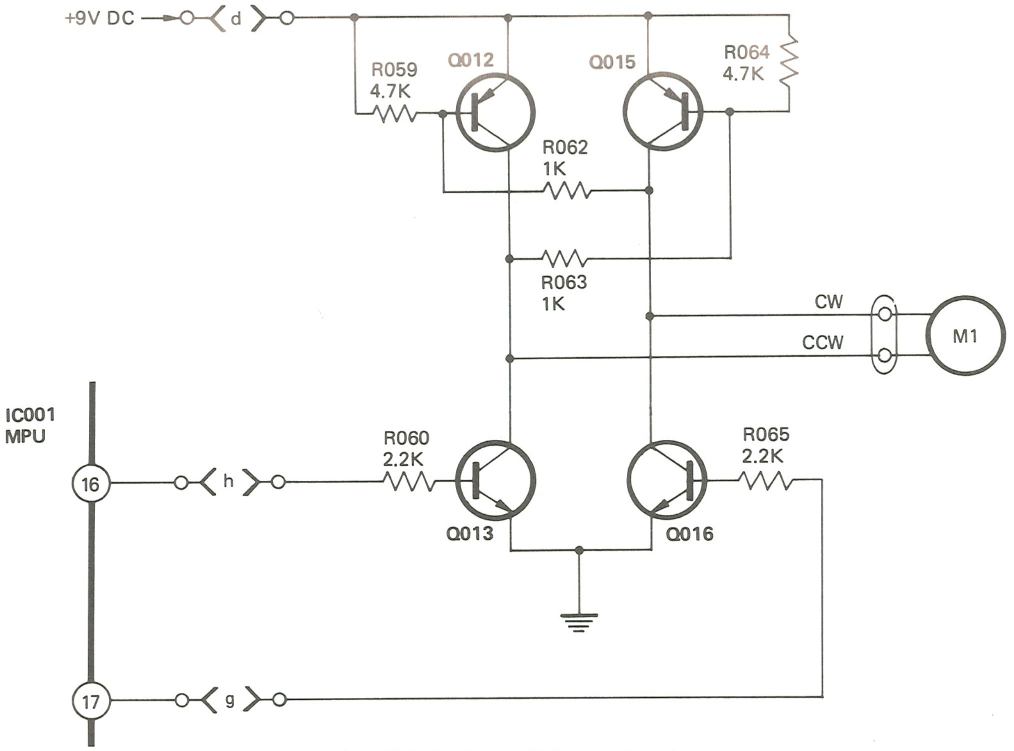


Fig. 7-4-4 Motor Driving Circuit

7-5 Supporting Circuit

Outline

This circuit consists of the three regulators for the power supply, thermal correction, interface and reset at the power ON and supports the stable operation of the system.

Details

7-5-1 Regulators/Power Supply

(1) +9V DC Regulator

The +9V DC regulator consists of Q001, Q002, Q003, D002 and D003, and regulates +9V for the ultrasonic transmission circuit.

During the ultrasonic transmission, the large current, approx. 1 - 2 amperes is flowed into the primary of T001 so that the separate and stable power supply is needed for the transmission.

The +12V DC input is supplied from pin 1 of CN103 to this +9V DC regulator through D001.

The +9V DC regulator also supplies the power to the echo-reception circuit and thermal correction circuit through the +5V DC regulator, IC004, and the motor driving circuit.

When the camera is in the standby mode, the +5V DC is supplied to the base of Q001 from pin 19 of IC001. Then, +9V DC becomes 0V so that the transmission, echo-reception, thermal correction and motor driving circuits are not functioned.

(2) +5V DC Regulators

There are two +5V DC regulators, IC004 and IC007. IC004 is the power supply for the echo-reception and thermal correction circuits, and is shut off when the camera is in the standby mode. The +9V DC is supplied from the +9V DC regulator.

IC007 is the power supply for IC001, interface and reset circuits, and is always functioned even the camera is in the standby mode.

7-5-2 Thermal Correction Circuit

The speed of the ultrasonic wave in the air is effected by the temperature.

When the temperature is changed from 0°C to 40°C, the speed of the ultrasonic wave in the air is varied approx. 7%. Therefore the correction circuit is needed for the accurate measurements of the time/distance.

The thermal correction circuit consist of IC008, thermistor TH001, corrects the reference of time/distance detection.

The correction signal is provided at pin 23 and 24 of IC001.

7-5-3 Interface Circuit

This circuit is interfaced for the informations between the camera and IC001.

At first, the reset circuit resets IC001 at the power ON with the IC005(c), IC005(d) and IC005(e), and also supplies the information whether the remote control unit is connected or not to the pin 8 of IC001 as;

- HIGH : Without remote control unit
- LOW : With remote control unit

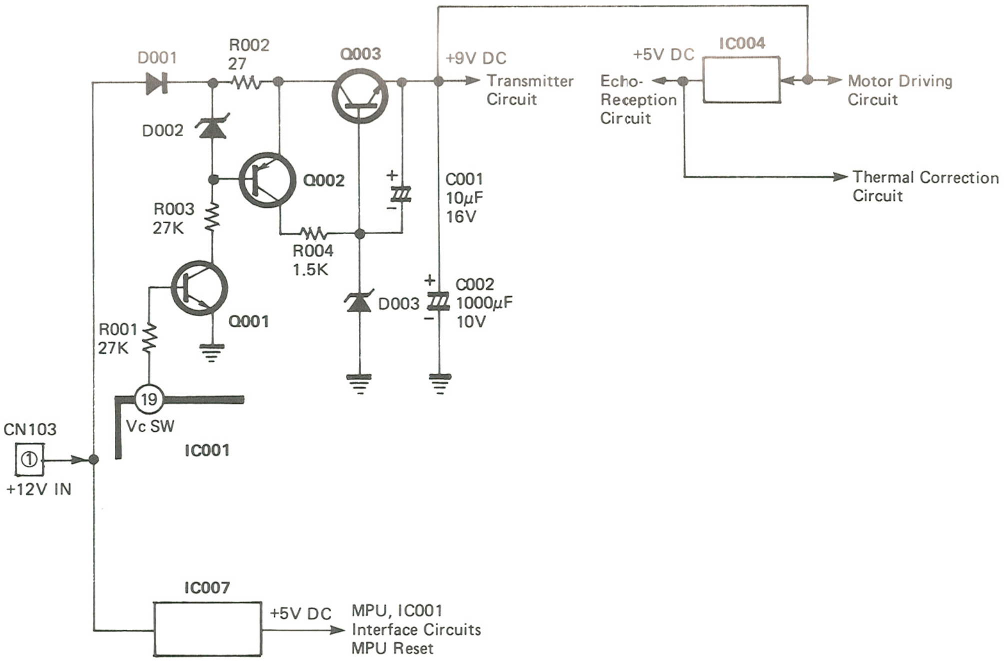

D001
R002
27
Q003
+9V DC
Transmitter Circuit
+5V DC
IC004
Echo-Reception Circuit
Motor Driving Circuit
D002
Q002
C001
10μF
16V
Thermal Correction Circuit
R003
27K
R004
1.5K
C002
1000μF
10V
D003
R001
27K
Q001
19
Vc SW
IC001
CN103
①
+12V IN
IC007
+5V DC
MPU, IC001
Interface Circuits
MPU Reset

Fig. 7-5-1 Regulators/Power Supply

Camera Operation without Camera Remote Control Unit
The informations at 5 pins connector are as;

(a) Pin 1
+12V DC input

(b) Pin 2
The positive polarity Vs at pin 2 of CN103 is supplied to the base of Q011 through C025 so that Q011 is ON for detecting Vs pulse at pin 25 of IC001. Pin 13 of IC001 supplies the signal as;

- HIGH : Without Camera Remote Control Unit
- LOW : With Camera Remote Control Unit

Pin 13 of IC001 supplies HIGH signal to the base of Q010 through R046 for effecting the switches, SW001 and SW002.
Q009 is not functioned for only Vs signal.
When the switch SW001 (AUTO FOCUS ON/OFF) is open, the Auto Focus mode is OFF position and Q010 is ON by applying the HIGH at the base of Q010 so that pin 22 of IC001 becomes LOW for the manual focusing or remote focusing.
When SW001 is close, the Auto Focus mode is ON position and the base of Q010 becomes LOW and Q010 is OFF so that pin 22 of IC001 becomes HIGH for the automatic focusing. When SW001 is open and the SW002 (AUTO/MAN) is kept pressing, the base of Q010 also becomes LOW so that pin 22 of IC001 becomes HIGH for the automatic focusing.
When Vs is not supplied, IC001 detects that the camera is in the standby mode and supplies HIGH at pin 19 of IC001 to shut off the +9V DC regulator, transmission, echo-reception, thermal correction and motor driving circuit are not functioned.

(c) Pin 3
The EVF display information is supplied from pin 18 of IC001 according to the input information at pin 22 of IC001 as;

LOW at pin 18 of IC001 when : pin 22 of IC001 is HIGH	Auto Focus Mode
HIGH at pin 18 of IC001 when : pin 22 of IC001 is LOW	Manual Focus/- Power Focus Mode

(d) Pin 4
When the camera remote control unit is not connected, pin 4 of CN103 is open and the base voltage of Q008 becomes LOW. Then Q008 is OFF so that pin 8 of IC001 becomes HIGH to identify for no remote control unit.

Camera Operation with Camera Remote Control Unit
The informations at 5 pins connector are as;

(a) Pin 1
+12V DC input

(b) Pin 2
When the Camera Remote Control Unit is connected, the HIGH is supplied to the base of Q008 from pin 4 of CN103 and Q008 is ON so that pin 8 of IC001 becomes LOW to identify for the connection of the camera remote control unit.
IC001 supplies the LOW to the base of Q010 through R046 so that the switches SW001 and SW002 and Q010 are not functioned.

(1) Vs + 0V DC for Auto Focus Mode :
When 0V DC is supplied from pin 2 of CN103 to the base of Q009 through R040 so that Q009 becomes OFF. And also Vs is supplied to the base of Q011 through C025 so that Q011 is ON while the Vs is applied.
The level at pin 22 of IC001 is HIGH for the automatic focusing.

(2) Vs + 2V DC (±1V) for Manual Focus Mode :
When 2V DC ±1V is supplied from pin 2 of CN103 to the base of Q009 and then Q009 is ON so that the level at pin 22 of IC001 becomes LOW for the manual focusing or power focusing.

(3) No Vs for Standby Mode :
When Vs is not supplied from pin 2 of CN103, IC001 detects no Vs at pin 25 of IC001 so that IC001 supplies the HIGH at pin 19 of IC001 to shut off the +9V DC regulator.

(c) Pin 3
Same as without Camera Remote Control Unit.

(d) Pin 4
When the camera remote control unit is connected, the following informations per each status is supplied at the base of Q008 to identify the status of the camera remote control unit as;

(1) HIGH for STOP mode
(2) Positive Polarity Vs for FAR mode
(3) Negative Polarity Vs for NEAR mode

IC001 supplies the pulse from pin 16 or 17 of IC001 to the motor driving circuit.

8. Electronic Viewfinder Board (YFVPKA0803JA)

The electronic viewfinder (EVF) board contains following circuits.

page
8-1 Video Amplifier Circuit 64
8-2 Horizontal Deflection Circuit 65
8-3 High Voltage Circuit 65

8-1 Video Amplifier Circuit

Outline

This circuit amplifies the video signal supplied from the Deflection board and fed it to the cathode ray tube (CRT).

Details

The video signal mixed with level indicator signal and character signal from the Deflection board is supplied to amplifier Q002 through pin No. 6 of EVF connector CN101, terminal No. 8 of CN001 and VR002 (CONTRAST).

The amplified video signal at the collector of Q002 is then supplied to grid-1(G1) of the CRT through terminal No. 4 of BI001 and CRT socket CN003 together with DC voltage set by VR003 (BRIGHTNESS).

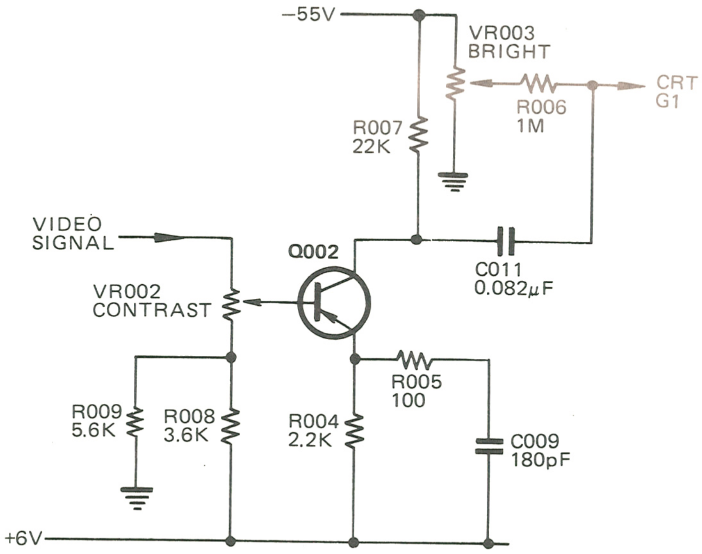

−55V
VR003
BRIGHT
R006
1M
CRT
G1
R007
22K
VIDEO
SIGNAL
Q002
C011
0.082μF
VR002
CONTRAST
R005
100
R009
5.6K
R008
3.6K
R004
2.2K
C009
180pF
+6V

Fig. 8-1 Video Amplifier Circuit

8-2 Horizontal Deflection Circuit

Outline

This circuit generates the horizontal(H) deflection sawtooth current for H.scanning beam inside the cathode ray tube (CRT).

Details

The frequency controlled horizontal drive (H.D.) pulse from the Deflection board is supplied to the base of switching amplifier Q001 through pin No. 1 of EVF connector CN101 and terminal No. 5 of CN001.

The horizontal(H) deflection sawtooth current obtained at the collector of Q001 is supplied to the H.deflection coil through C002, L002, VL001 (H.SIZE) and terminal No. 4 of CN002.

The flyback pulse obtained at the collector of Q001 is also fed to the high voltage circuit.

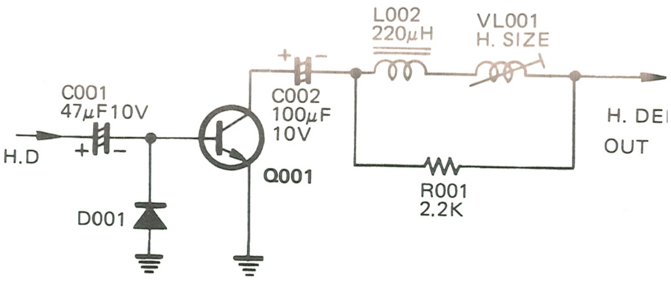

L002
220μH
VL001
H. SIZE
C001
47μF10V
C002
100μF
10V
H. DE
OUT
H.D
Q001
R001
2.2K
D001

Fig. 8-2 H. Deflection Circuit

8-3 High Voltage Circuit

Outline

This circuit generates high voltages for cathode ray tube (CRT) electrodes.

Details

The flyback pulse generated in the horizontal(H) deflection circuit is supplied to primary winding of the flyback transformer (FBT) in high voltage pack T001 to step up the flyback pulse to necessary level. The boosted pulses obtained at the secondary winding of the transformer are rectified to generate high voltages.

+4.5KV obtained by rectifying the boosted pulse is supplied to the CRT anode.

+600V obtained by rectifying the boosted pulse with D003 and C005 is supplied to grid-3(G3) of the CRT through VR001 (FOCUS). The voltage of grid-2(G2) is derived by dividing +600V by VR001, R002 and R003.

The voltage of grid-1(G1) is derived by rectifying the negative pulse from the FBT by D002 and C008. Then the rectified -55V is supplied to G1 through VR003 (BRIGHTNESS) together with the video signal supplied from the video amplifier circuit.

The heater voltage for CRT is supplied +6V and +8.6V from the Deflection board through EVF connector CN101 and CN001.

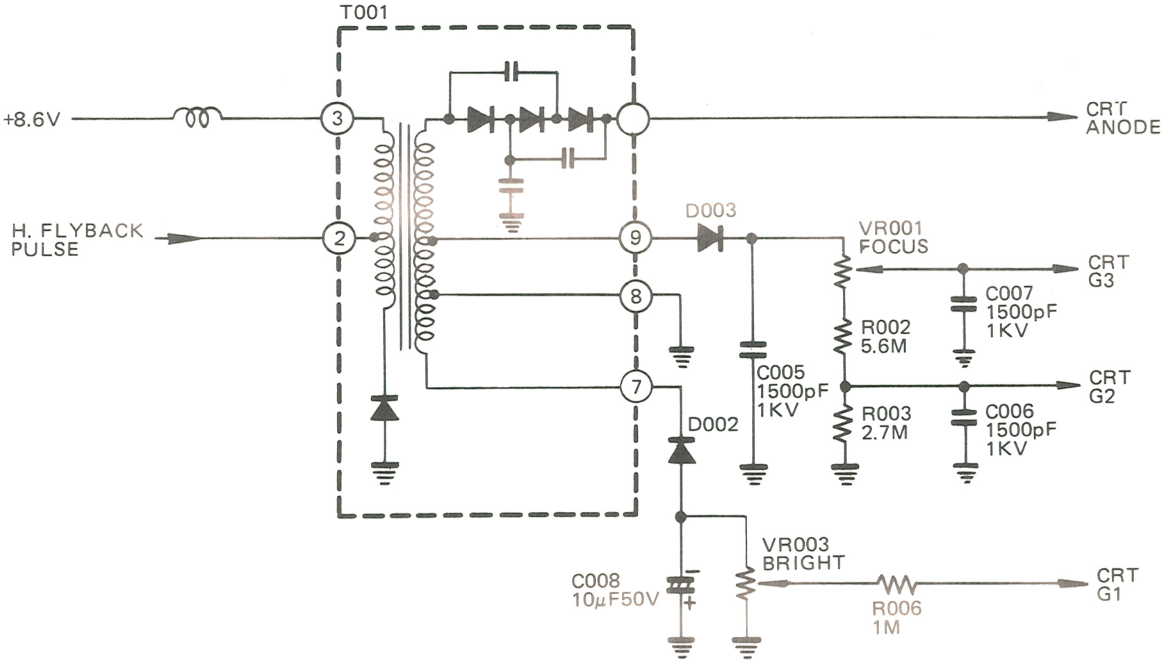

T001
+8.6V
3
H. FLYBACK PULSE
2
9
8
7
CRT ANODE
D003
VR001 FOCUS
CRT G3
C007 1500pF 1KV
R002 5.6M
C005 1500pF 1KV
CRT G2
D002
R003 2.7M
C006 1500pF 1KV
VR003 BRIGHT
C008 10μF50V
R006 1M
CRT G1

Fig. 8-3 High Voltage Circuit

9 Camera Remote Control Unit (Option) WV-CR10E/WV-CR10N

Contents **Page**

Outline 75
Details 75
  9-1 Power Zoom 75
  9-2 Auto-Manual Selection 75
  9-3 Power Focus 75
  9-4 FADE and REC Switch 75

9 Camera Remote Control Unit (Option)

Outline

This camera remote control unit, WV-CR10E/WV-CR10N is used to control the camera operations remotely with the detached EVF unit for Power Zoom, Power Focus, Auto Focus Auto/Man Selection, Fade and VTR Start/Stop Switch (REC).

Details

9-1 Power Zoom

The switch for WIDE and TELE is the seesaw type switch so that only either switch is ON or OFF. The WIDE switch, SW6 is connected with the base of Q006 on the deflection board through camera remote connector CN101.

The TELE switch, SW7 is connected with the base of Q004 on the deflection board through camera remote connector CN101.

When the WIDE switch, SW6 is closed, the base of Q006 on the deflection board becomes LOW and Q006 is ON. The base of Q004 on the deflection board is HIGH so that Q004 is OFF. The base of Q003 on the deflection board also becomes LOW so that Q003 is ON and drives the power zoom motor for WIDE.

When the TELE switch, SW7 is closed, the base of Q004 on the deflection board becomes LOW and Q004 is ON. The base of Q006 on the deflection board is HIGH so that Q006 is OFF.

The base of Q005 on the deflection board also becomes LOW so that Q005 is ON and drives the power zoom motor for TELE.

The power zoom switch on the adjustable handle grip has priority.

When the WIDE switch on the camera is pressed during the TELE switch, SW7 on the camera remote control unit is closed, the base of Q005 on the camera remote control unit becomes LOW so that Q005 is OFF and the WIDE switch on the grip is activated.

When the TELE switch on the grip is pressed during the WIDE switch, SW6 on the camera remote control unit is closed, the base of the Q004 on the camera remote control unit becomes LOW so that Q004 is OFF and the TELE switch on the grip is activated.

9-2 Auto-Manual Selection

When the AUTO/MAN selection switch, SW3 is AUTO side, Q003 on the camera remote control unit is OFF so that the collector of Q003 is LOW.

The signal at pin 2 of camera remote connector CN101 is (Vs + 0V DC) which is supplied to AF (Auto Focus) connector through deflection board.

When the AUTO/MAN selection switch, SW3 is MAN side, Q003 is ON so that the collector of Q003 is HIGH. The signal at pin 2 of camera remote control connector CN101 is (Vs + HIGH V DC) which is supplied to AF connector through deflection board.

9-3 Power Focus

The vertical scanning start pulse Vs (positive polarity) is supplied from pin 2 of camera remote connector CN101 to the base of Q001 so that the positive polarity Vs is inverted and the negative one is obtained at the collector of Q001.

The negative polarity Vs is also supplied from the collector of Q001 to the base of Q002 so that the positive polarity Vs is obtained at the collector of Q002.

The signal at pin 4 of camera remote connector CN101 is obtained according to the position of the power focus switch as;

- By pressing SW1, FAR : Positive Polarity Vs
- By pressing SW2, NEAR : Negative Polarity Vs
- By no pressing SW, STOP : HIGH V DC

and is supplied to pin 4 of AF connector, CN103 through deflection board.

9-4 FADE and REC Switch

When the FADE switch SW5 is pressed, +4.8V DC is supplied to pin 5 of camera remote connector CN101. This +4.8V DC is supplied to process board through the deflection board and the camera is ready for FADE-IN or FADE-OUT.

When the REC switch SW4 is pressed, the low level is supplied to the pin 5 of CN101. This low level is supplied to the process board through deflection board and the camera becomes the REC-PLAY or REC-PLAY-PAUSE mode.

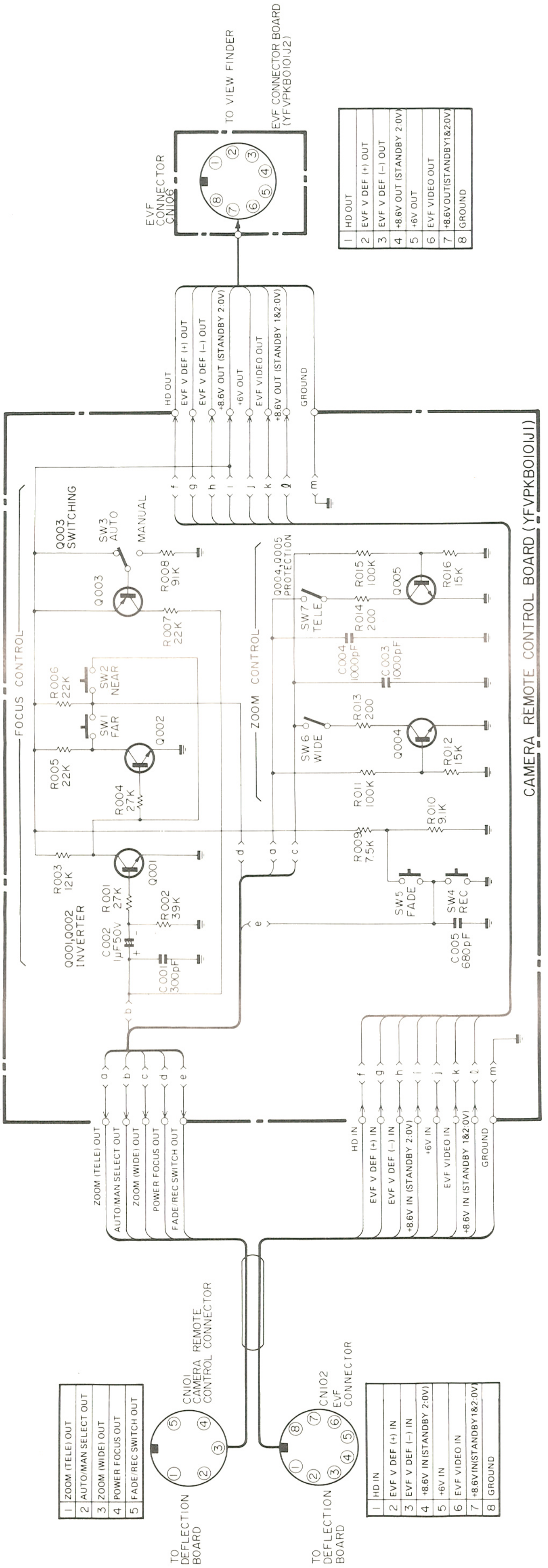

TO VIEW FINDER
EVF CONNECTOR BOARD (YFVPKB0101J2)
EVF CONNECTOR CN106
1 HD OUT
2 EVF V DEF (+) OUT
3 EVF V DEF (−) OUT
4 +8.6V OUT (STANDBY 2.0V)
5 +6V OUT
6 EVF VIDEO OUT
7 +8.6V OUT(STANDBY1&2.0V)
8 GROUND
CAMERA REMOTE CONTROL BOARD (YFVPKB0101J1)
FOCUS CONTROL
ZOOM CONTROL
Q003 SWITCHING
SW3 AUTO
MANUAL
Q004,Q005 PROTECTION
Q001,Q002 INVERTER
R001 27K
R002 39K
R003 12K
R004 27K
R005 22K
R006 22K
R007 22K
R008 9.1K
R009 7.5K
R010 9.1K
R011 100K
R012 15K
R013 200
R014 200
R015 100K
R016 15K
C001 300pF
C002 1μF50V
C003 1000pF
C004 1000pF
C005 680pF
SW1 FAR
SW2 NEAR
SW4 REC
SW5 FADE
SW6 WIDE
SW7 TELE
Q001
Q002
Q003
Q004
Q005
ZOOM (TELE) OUT
AUTO/MAN SELECT OUT
ZOOM (WIDE) OUT
POWER FOCUS OUT
FADE/REC SWITCH OUT
HD IN
EVF V DEF (+) IN
EVF V DEF (−) IN
+8.6V IN (STANDBY 2.0V)
+6V IN
EVF VIDEO IN
+8.6V IN (STANDBY 1&2.0V)
GROUND
CN101 CAMERA REMOTE CONTROL CONNECTOR
TO DEFLECTION BOARD
1 ZOOM (TELE) OUT
2 AUTO/MAN SELECT OUT
3 ZOOM (WIDE) OUT
4 POWER FOCUS OUT
5 FADE/REC SWITCH OUT
CN102 EVF CONNECTOR
TO DEFLECTION BOARD
1 HD IN
2 EVF V DEF (+) IN
3 EVF V DEF (−) IN
4 +8.6V IN(STANDBY 2.0V)
5 +6V IN
6 EVF VIDEO IN
7 +8.6V IN(STANDBY1&2.0V)
8 GROUND

Fig. 9 Camera Remote Control Unit

ORDER NO. VKD82080646C8

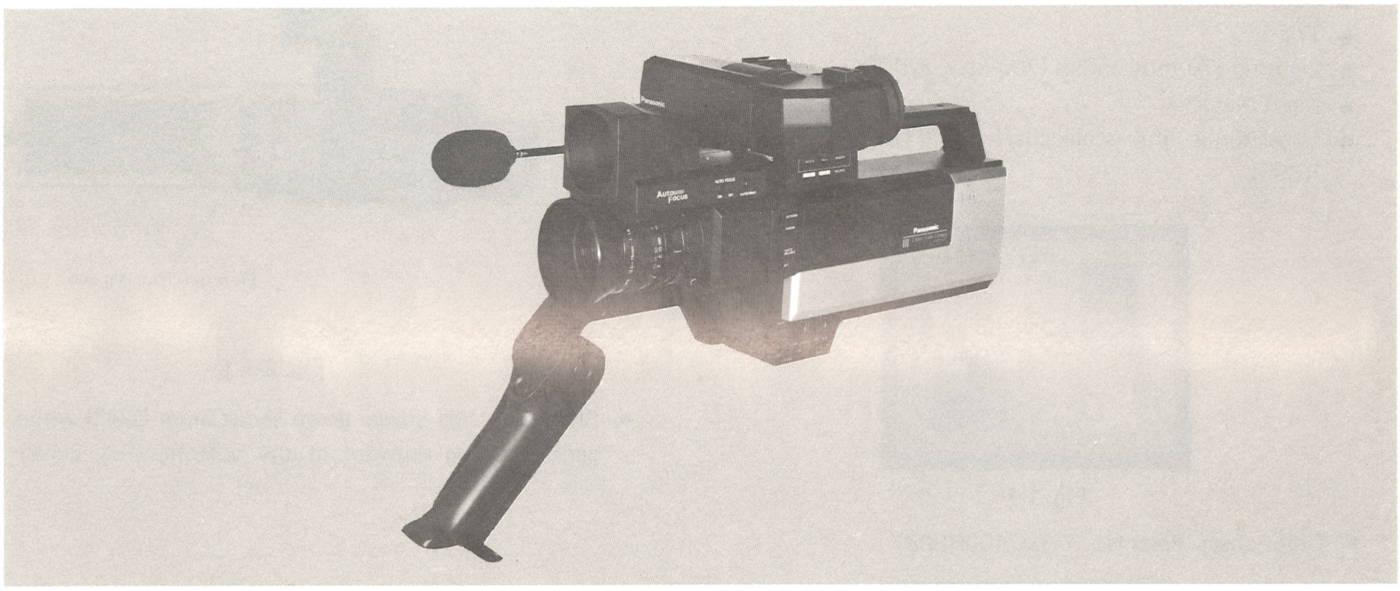
Service Manual

Vol. 2

Adjustment Procedures
Trouble Shooting Guides

Colour Video Cameras

WVP-100E/WVP-100N



CONTENTS

1. TEST EQUIPMENT REQUIRED 1
2. DISASSEMBLY PROCEDURE FOR ADJUSTMENT . . . . 1~5
    - 2-1. Camera Unit 1
    - 2-2. Microphone Unit 2
    - 2-3. Viewfinder Unit 3
    - 2-4. Auto Focus Lens 4
3. PICK-UP TUBE REPLACEMENT 6
4. ADJUSTMENT PROCEDURE . . . . 10~26
    - 4-1. Connection and Setting Up for Adjustment 10
    - 4-2. Camera Unit Adjustment 10
    - 4-3. Viewfinder Adjustment 22
    - 4-4. Auto Focus Lens Adjustment 26

LOCATION OF TEST POINTS AND ADJUSTING CONTROLS
- DEFLECTION BOARD 23
- PROCESS BOARD 23
- MICRO PROCESSOR BOARD 24
- VIEWFINDER BOARD 24
- AUTO FOCUS BOARD 24

MICRO PROCESSOR BOARD REMOVAL 27
TROUBLE SHOOTING GUIDE 29
CHIP COMPONENTS 41

National / Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

1 TEST EQUIPMENT REQUIRED

The following equipment is required for adjustment of WVP-100 color camera.

- Oscilloscope
  (dual trace, delayed, 25MHz bandwidth, with three proves, one must be 1:1)
- Digital voltmeter (DVM)
- Frequency counter
- Vectorscope
- Color video monitor
- Tripod
- Lighting [70 footcandles (700 lux), 3200°K]
- Light meter
- Logarithmic gray scale chart (Parts No. YWV2310-RB99)

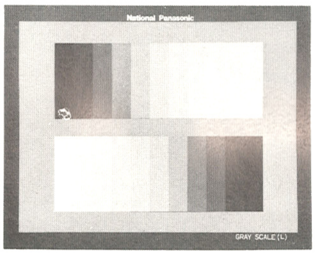

National Panasonic
GRAY SCALE (L)

Fig. 1-1

- Color chart (Parts No. YWV2100RB98)

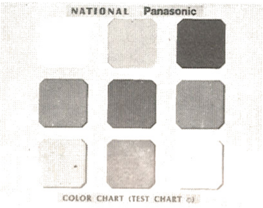
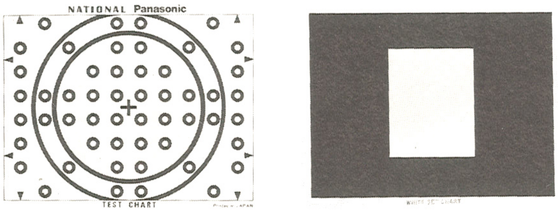

NATIONAL Panasonic
COLOR CHART (TEST CHART c)

Fig. 1-2

- Ball chart (Parts No. YWV2100RB03)


NATIONAL Panasonic
TEST CHART

Front

Rear

Fig. 1-3

Test equipment denoted by shading not required for pick-up tube replacement only.

2 DISASSEMBLY PROCEDURE FOR ADJUSTMENT

2-1 Camera Unit

- Turn power off.
- Remove two screws from bottom of the each side cover holding the both side covers. (Fig. 2-1-1)

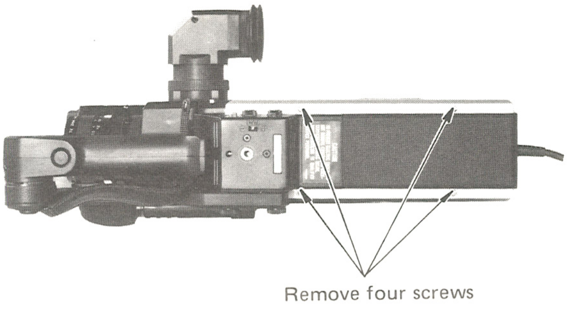

Remove four screws

Fig. 2-1-1

- Slide both side covers down about 5mm (1/4") while gently pulling outward at the bottom. (Fig. 2-1-2)

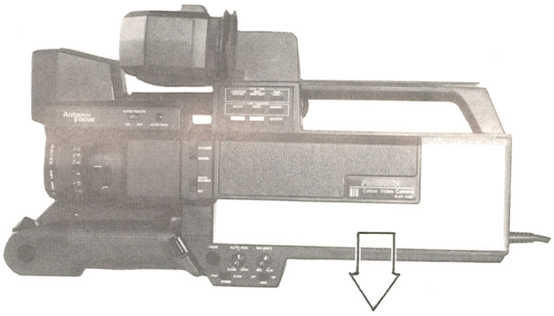


Fig. 2-1-2

- Both side covers may be removed by pulling them outward.
- Remove three screws holding the printed circuit board (PCB) in order to gain access to the desired circuitry.

(A) For left side PCB (viewed from the front)
Deflection Circuit Board (YFVPKB1001EA)

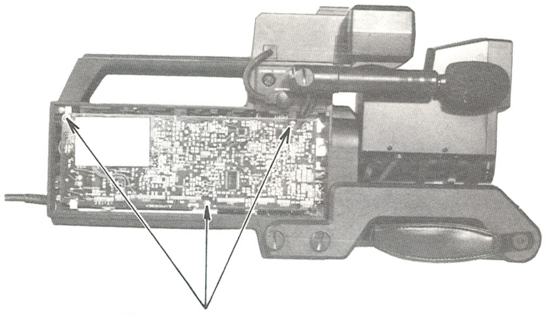

Remove three screws

Fig. 2-1-3

Note : When replacing the deflection circuit board, make sure the insulating washer is in place.

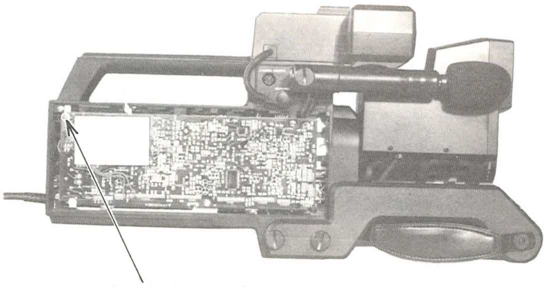

Insulating washer

Fig. 2-1-4

(B) For right side PCB (viewed from the front)
Process Circuit Board (YFVPKC1001EA)

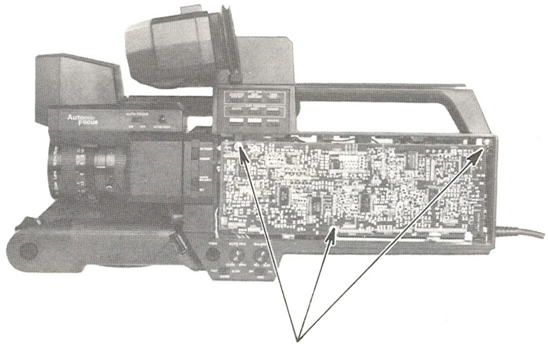

Remove three screws

Fig. 2-1-5

Note : When replacing the process circuit board, make sure the insulating washers are in place.

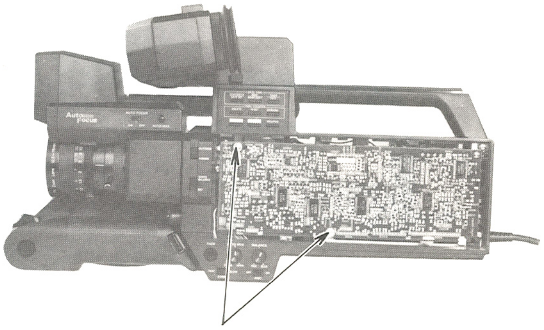

Insulating washers

Fig. 2-1-6

2-2 Microphone Unit

- Disconnect the microphone connector.
- Loosen microphone holding screw and slide backward.

Loosen
microphone holding screw

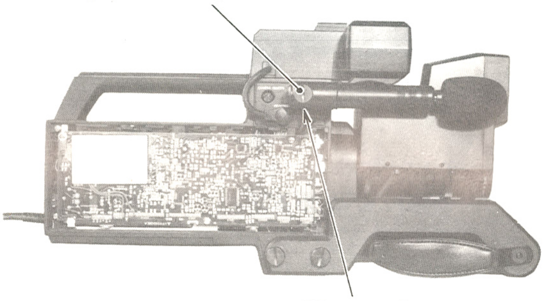

Disconnect
microphone connector

Fig. 2-2-1

- Microphone unit may be removed by pulling outward.

2-3 Viewfinder Unit

- Disconnect the viewfinder connector. (Fig. 2-3-1)

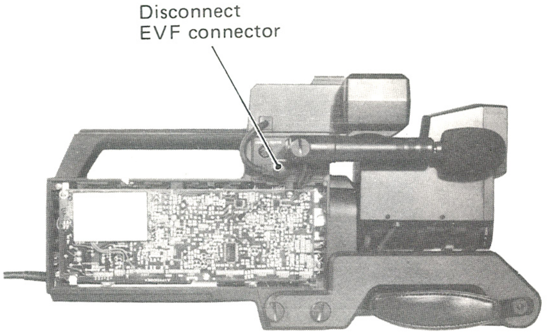

Disconnect
EVF connector

Fig. 2-3-1

- Release EVF locking knob and slide EVF unit forward. (Fig. 2-3-2)

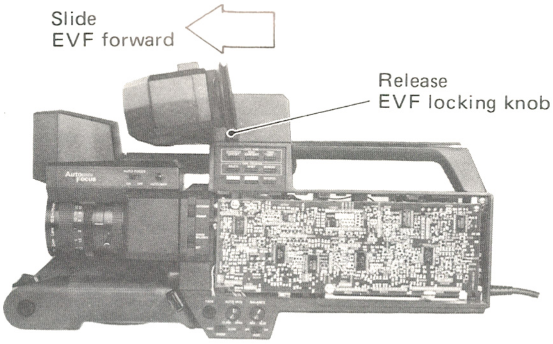

Slide
EVF forward
Release
EVF locking knob

Fig. 2-3-2

- Loosen viewfinder case holding ring by turning counterclockwise. (Fig. 2-3-3)

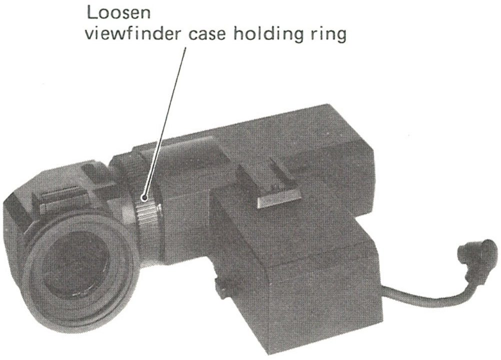

Loosen
viewfinder case holding ring

Fig. 2-3-3

- Remove two screws from the bottom and remove bottom cover. (Fig. 2-3-4, Fig. 2-3-5)

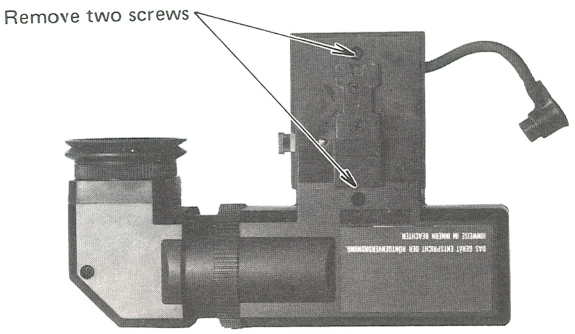

Remove two screws

Fig. 2-3-4

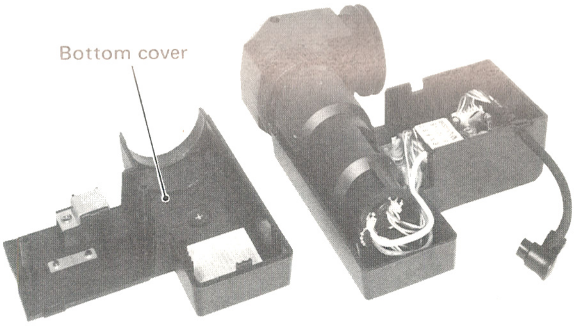

Bottom cover

Fig. 2-3-5

Note : When replacing the bottom cover, make sure the plate spring in the top cover is attached. (Fig. 2-3-6)

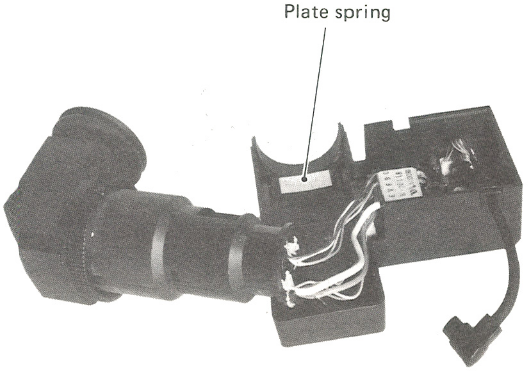


Plate spring

Fig. 2-3-6

- Remove one screw from the top side of the CRT case, release locking tab and carefully pull apart. (Fig. 2-3-7)

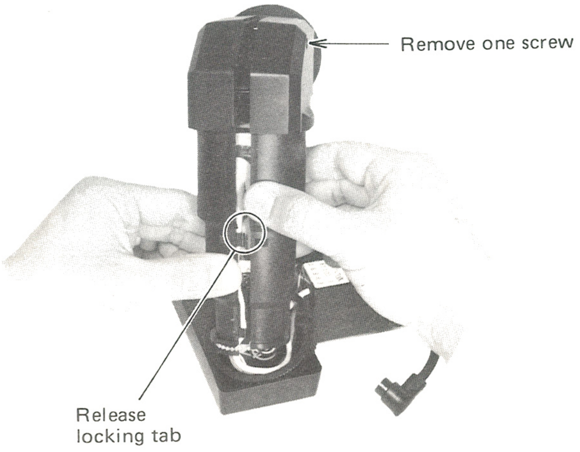

Remove one screw
Release locking tab

Fig. 2-3-7

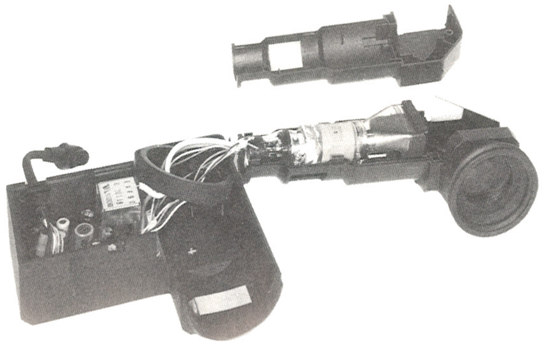


Fig. 2-3-8

Note : When replacing CRT and case assembly, make sure the wires connecting to CRT socket assembly and printed circuit board are in the ditch portion of the bottom cover. (Fig. 2-3-9)

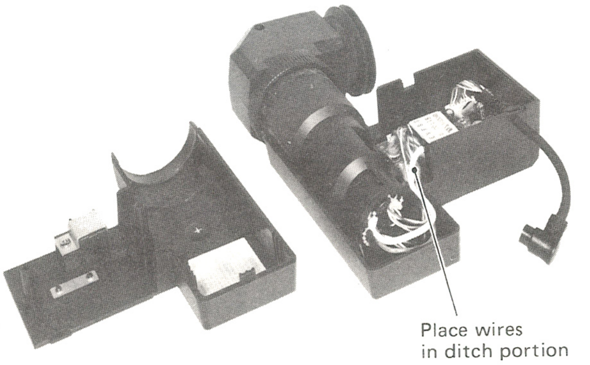

Place wires in ditch portion

Fig. 2-3-9

2-4 Auto Focus Lens-1

Right side case removal for gain adjustment

- Disconnect two connectors from the front portion of the camera.
- Loosen two screws on the handle grip and swing the handle grip.
- Remove the lens by turning counterclockwise.

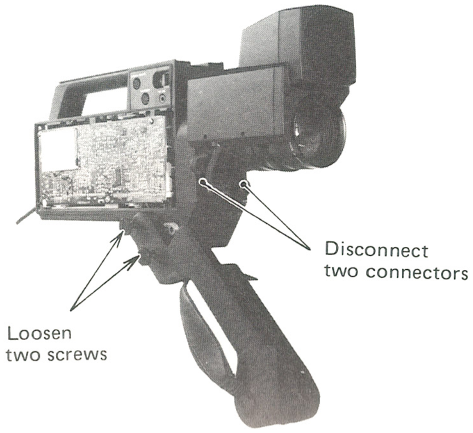

Disconnect two connectors
Loosen two screws

Fig. 2-4-1

- Remove the lens hood.
- Remove three screws on the front portion of the cover. (Fig. 2-4-2)

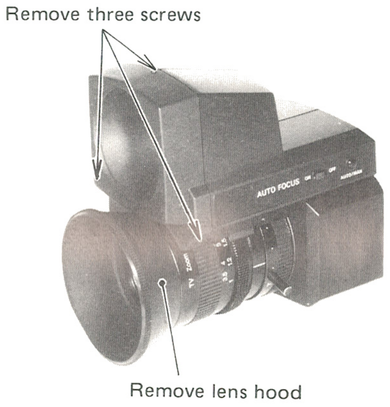

Remove three screws
AUTO FOCUS
Remove lens hood

Fig. 2-4-2

- Depress the case to release locking tabs and gently remove the front cover. (Fig. 2-4-3)

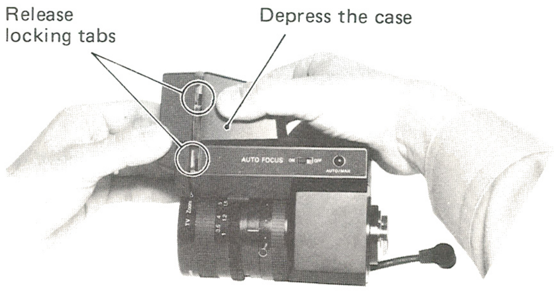

Release locking tabs
Depress the case
AUTO FOCUS

Fig. 2-4-3

- Remove two screws on the right side cover. (Fig. 2-4-4)

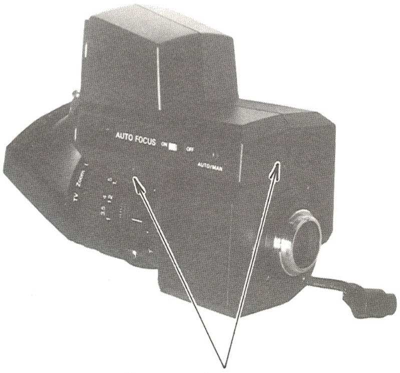

AUTO FOCUS
ON
OFF
AUTO/MAN
Remove two screws

Fig. 2-4-4

- Depress the top case to release locking tabs and gently pull apart and remove right side cover. (Fig. 2-4-5)

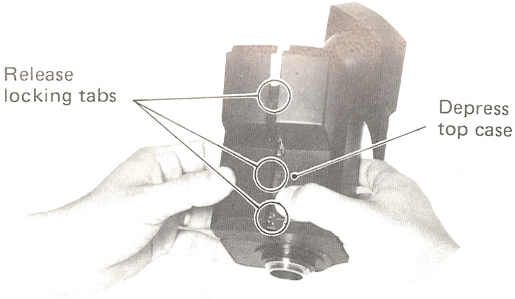

Release
locking tabs
Depress
top case

Fig. 2-4-5

- Remove two screws on the AUTO/MAN switch board and remove the AUTO/MAN switch board from the case. (Fig. 2-4-6)

  Note : When replacing the right side cover, make sure to install the auto focus circuit board end is in the ditch of the case.

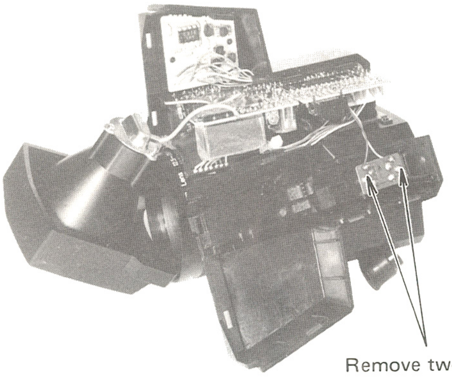

Remove two screws

Fig. 2-4-6

- Install the front cover using two screws for gain adjustment. (Fig. 2-4-7)

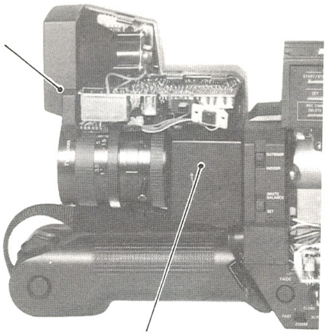

Install
front cover
Reinstall the lens

Fig. 2-4-7

2-5 Auto Focus Lens-2

Auto Focus Board removal

- Remove the front cover and right side cover as previously described in section 2-4 "Auto Focus Lens-1" on page 4 and 5.
- Remove three screws on the left side of the case and carefully remove the auto focus circuit board from the lens unit. (Fig. 2-5-1, Fig. 2-5-2)

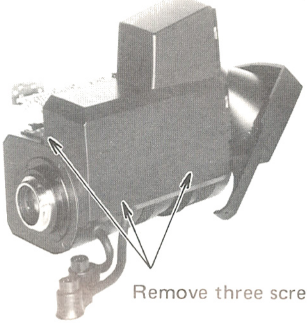

Remove three screws

Fig. 2-5-1

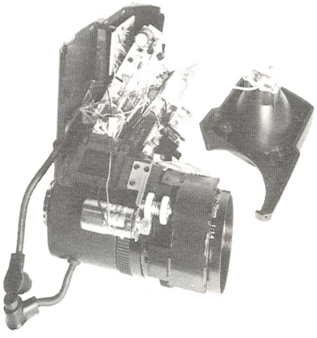
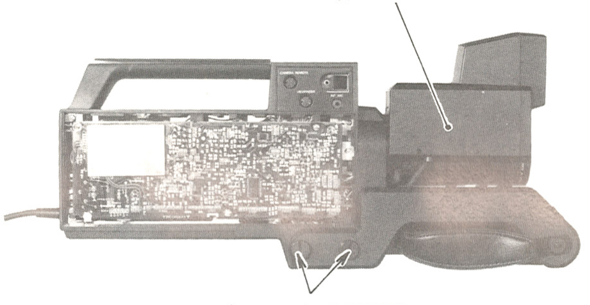


Fig. 2-5-2

- Remove the auto focus circuit board from the case by pulling it outward.

3 PICK-UP TUBE REPLACEMENT

- Disassemble the camera as previously described in Section 2 "DISASSEMBLY PROCEDURE FOR ADJUSTMENT" on page 1.
- Disconnect the viewfinder connector from the camera. (Refer to Fig. 2-3-1 on page3.)
- Release EVF locking knob and slide EVF unit forward to remove from the camera.
- Loosen two handle grip holding screws.
- Disconnect the lens connector from the front panel and remove the lens by turning it counterclockwise (viewed from lens side). (Fig. 3-1)


Remove lens

Loosen two screws

Fig. 3-1

- Remove two screws holding the front cover and remove the front cover. (Fig. 3-2)

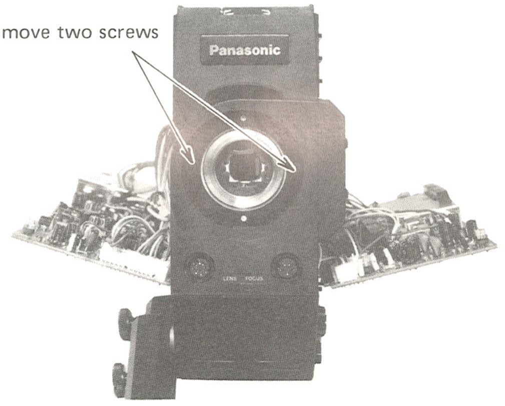

Remove two screws

Fig. 3-2

- Remove four screws holding the front chassis and one screw holding the color conversion filter assembly cover on the right side of the camera. And remove the front chassis. (Fig. 3-3)

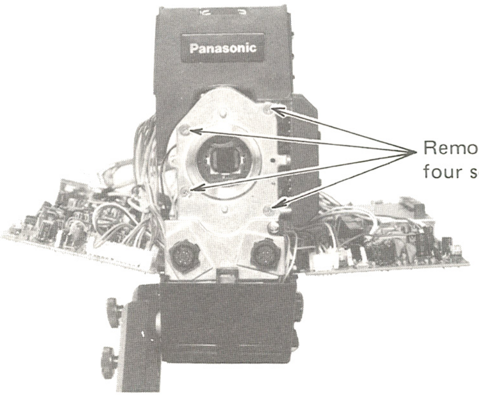

Remove four screws

Fig. 3-3

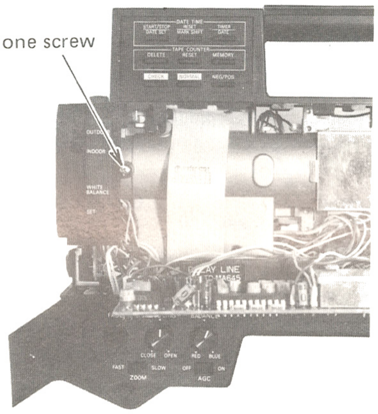
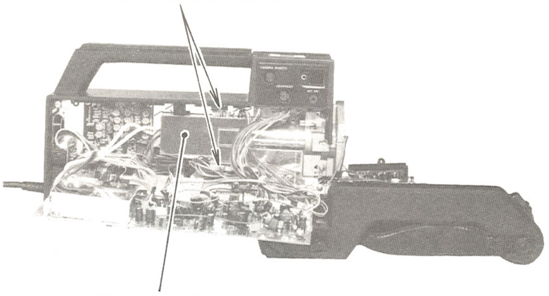

Remove one screw

Fig. 3-4

- Remove two screws holding the pick-up tube socket shield case B and two ground leads from process board and deflection board.
And remove the shield case A and B. (Fig. 3-5)


Remove two screws

Pick-up tube socket
shield case B

Fig. 3-5

- Remove two screws on the coil holder B and remove two ground leads for deflection coil and pick-up tube socket. (Fig. 3-6)
- Disconnect the pick-up tube socket from the pick-up tube. (Fig. 3-6)
- Remove two screws on the coil holder A, and remove the coil holder A and back focus adjusting pin. (Fig. 3-6)

  Note : Do not loose the plastic washer on the back-focus adjusting pin.

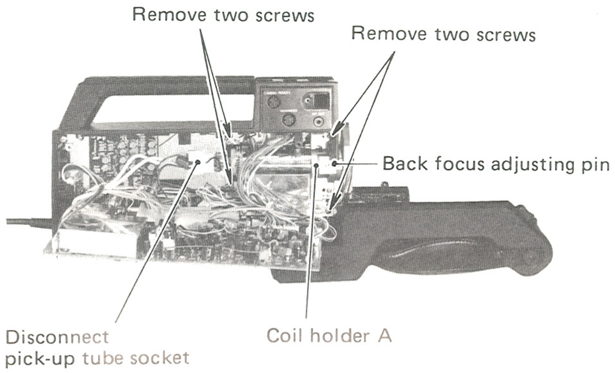

Remove two screws
Remove two screws
Back focus adjusting pin
Disconnect pick-up tube socket
Coil holder A

Fig. 3-6

- Remove two screws holding the shield plate for preamplifier board and remove the shield plate and the plate holding capacitor C001. (Fig. 3-7)

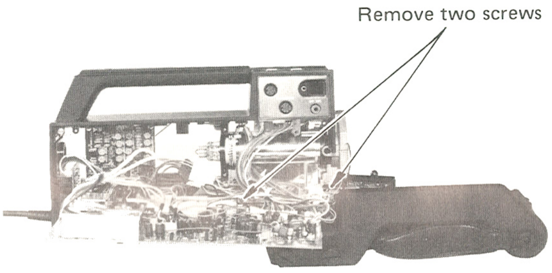

Remove two screws

Fig. 3-7

- Unsolder the target lead. (Fig. 3-8)

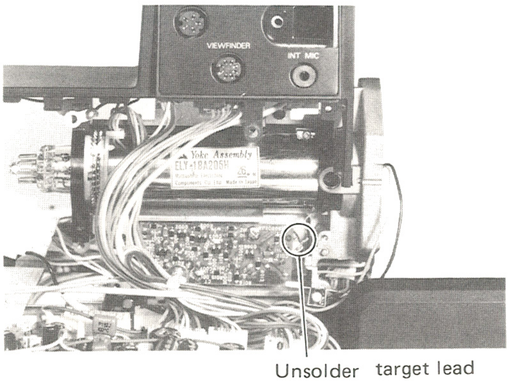

Unsolder target lead

Fig. 3-8

- Remove the deflection coil along with the coil holder B from the chassis by pulling it backward. (Fig. 3-9)

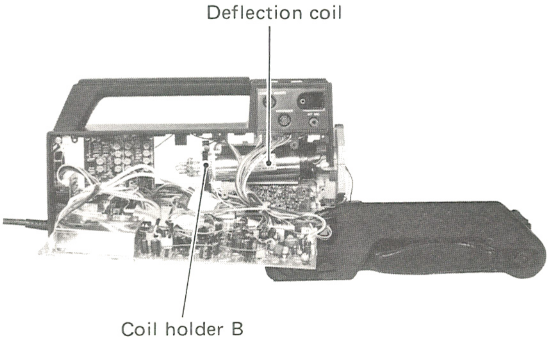

Deflection coil
Coil holder B

Fig. 3-9

- Remove the filter assembly from the deflection coil.
- Loosen the pick-up tube holding screw and push out the pick-up tube. (Fig. 3-10)

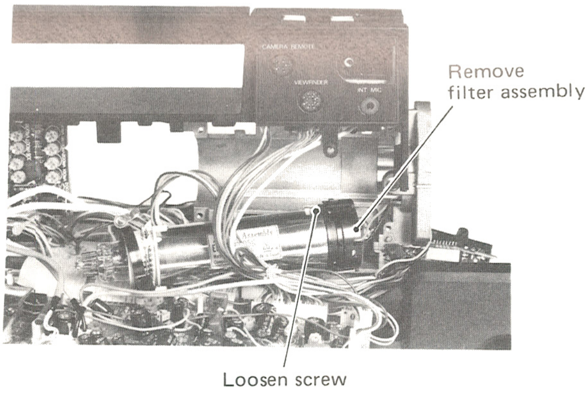

Remove filter assembly
Loosen screw

Fig. 3-10

- Insert the new pick-up tube into the deflection coil and push it completely until it stops.

  Note: 1 When inserting the pick-up tube in place, be careful not expose the pick-up tube face plate directry to a bright light.

  2 Make sure the pick-up tube is positioned correctly, i.e., the socket guide (blank pin) portion is on the right viewed from rear of the pick-up tube. (Fig. 3-11)

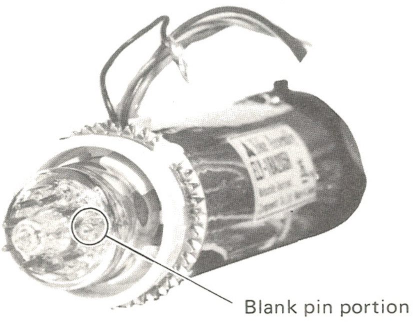

Blank pin portion

Fig. 3-11

- Clean the new pick-up tube faceplate with the lens cleaning tissue or cloth.
- Install the filter assembly to the deflection coil.
- Tighten the pick-up tube holding screw to secure the pick-up tube in place.
- Install the pick-up tube with deflection coil into the chassis.

  Note : 1. The target lead has to be positioned downward.

  2. Make sure the protruding part of the deflection coil engages the recessed part of the chassis. (Fig. 3-12)

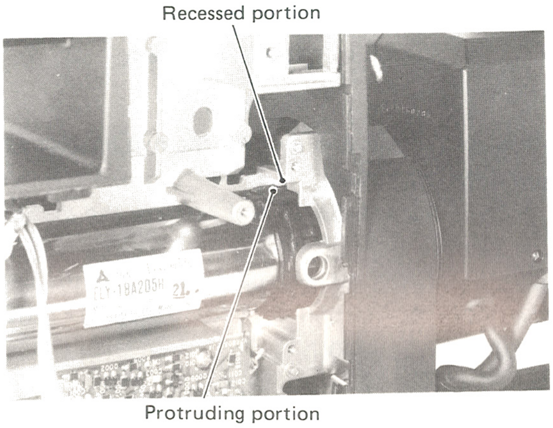

Recessed portion
Protruding portion

Fig. 3-12

- Replace the coil holder B to the deflection coil (Fig. 3-13) and attach to chassis with two screws.

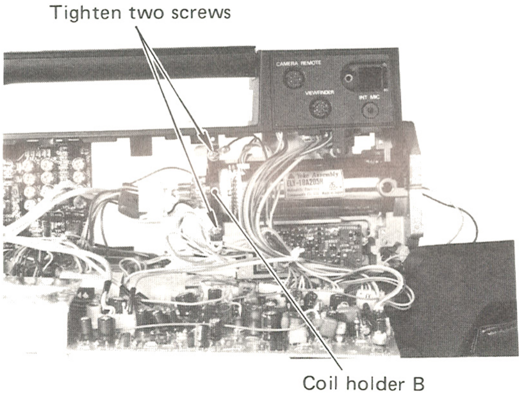

Tighten two screws
Coil holder B

Fig. 3-13

Note : When replacing the coil holder B, also fix the two ground leads for the deflection coil and the pick-up tube socket. (Fig. 3-14)

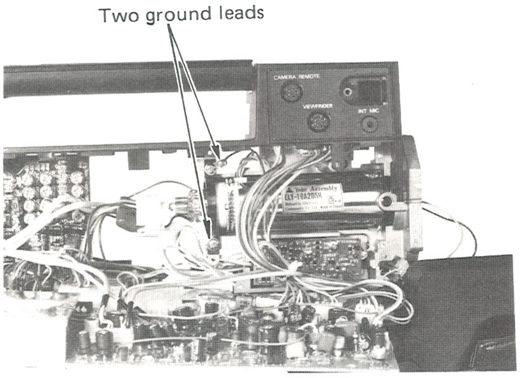

Two ground leads

Fig. 3-14

- Solder the target lead.
- Replace the shield plate for preamplifier and the plate holding capacitor C001 with two screws.
- Align the ditch on the front portion of the deflection coil with the hole for the backfocus adjusting pin by moving the deflection coil. (Fig. 3-15)

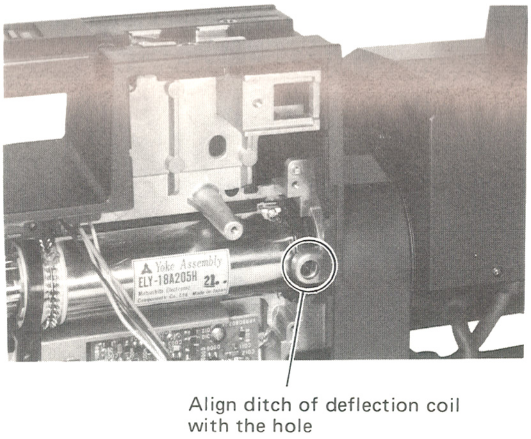

Align ditch of deflection coil with the hole

Fig. 3-15

- Insert the backfocus adjusting pin into the hole and confirm that the deflection coil moves back and forth by turning the backfocus adjusting pin. (Fig. 3-16)

  Note : The eccentric pin side of backfocus adjusting pin should be inserted into the hole. And attach the plastic washer onto the backfocus adjusting pin before insert it.

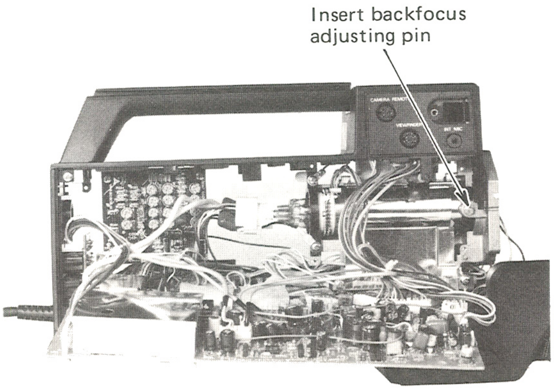

Insert backfocus adjusting pin

Fig. 3-16

- Replace the coil holder A and attach to the chassis with the two screws. (Fig. 3-17)
- Connect the pick-up tube socket to the pick-up tube.

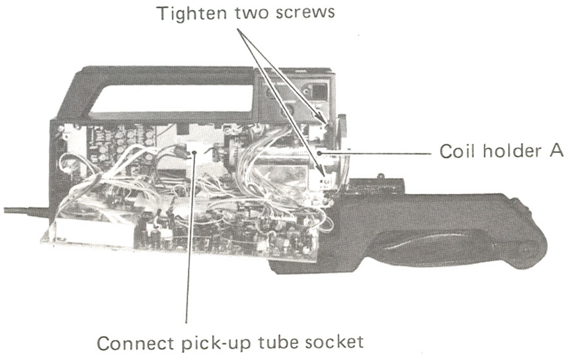

Tighten two screws
Coil holder A
Connect pick-up tube socket

Fig. 3-17

- Replace the pick-up tube socket shield case A and B, and two ground leads for the deflection and process boards with two screws.

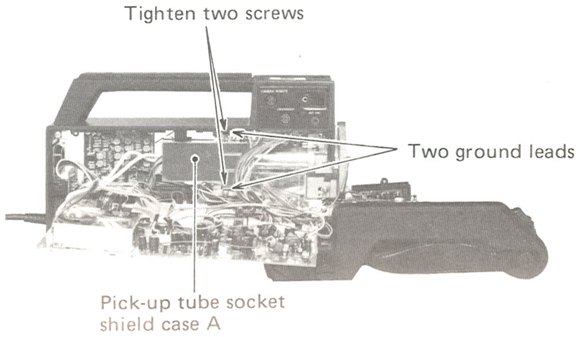

Tighten two screws
Two ground leads
Pick-up tube socket
shield case A

Fig. 3-18

- Replace the front chassis with five screws. (Fig. 3-19)

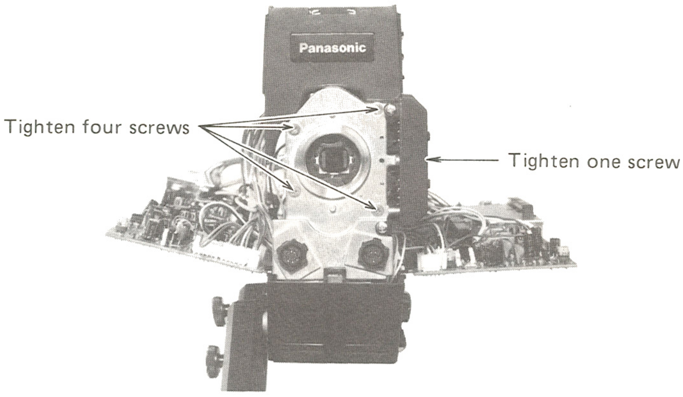

Panasonic
Tighten four screws
Tighten one screw

Fig. 3-19

- Replace the front cover with two screws. (Fig. 3-20)

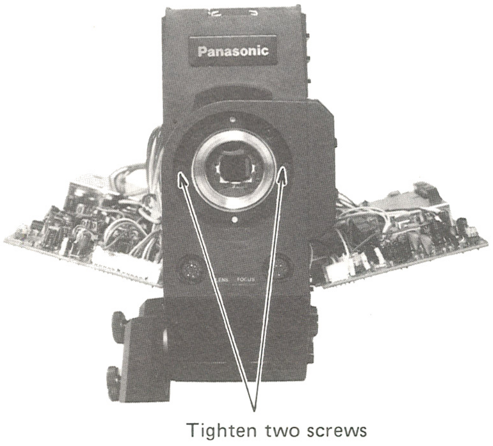

Panasonic
Tighten two screws

Fig. 3-20

- Replace the lens and connect the two lens connector onto the front panel.
- Replace the viewfinder and connect the viewfinder connector.
- **After replacing the pick-up tube, adjust the camera according to Section 4 "ADJUSTMENT PROCEDURE" on page 10.**

4 ADJUSTMENT PROCEDURE

4-1 Connection and Setting Up for Adjustment

Connection

- Connect the camera cable from the camera to the power supply.
- Connect the video cable from the power supply to the color monitor.
- Terminate the color monitor video input in 75 ohms.

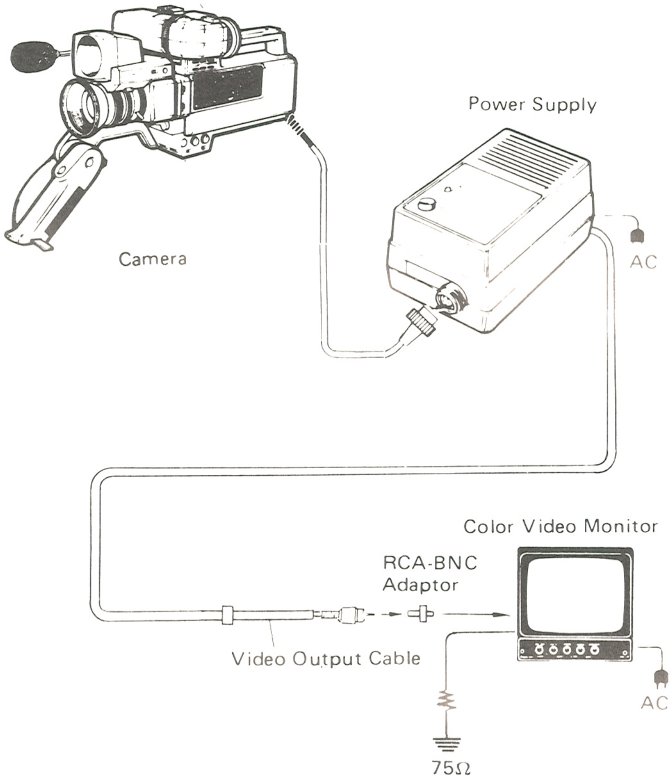


Fig. 4-1-1

Disassembling

- Disassemble the camera while referring to Section 2.
- "DISASSEMBLY PROCEDURE FOR ADJUSTMENT" on page 1.

Setting up

- Light : Incident light intensity on chart : 70 footcandles (700 lux)
  Color temperature : 3200°K
- Test Charts : Logarithmic gray scale chart (YWV-2310RB99)
  Color chart (YWV2100RB98)
  Flat white chart
  Ball chart (YWV2100RB03)

Steps denoted by shading need not be performed for pick-up tube replacement only.

Position of controls and switches on the camera

- Set the controls and switches on the camera as follows;

Indoor/Outdoor switch	Lower (INDOOR) position
White balance switch	Upper (WHITE BALANCE) position
Iris Close/Auto/Open control	Center(Auto)position
Color adjustments control	Center (BALANCE) position
Standby power switch	Right (ON) position
AGC ON/OFF switch	Right (ON) position
YL ON/OFF switch (SW001 on process board)	ON position

Note : TP in the manual refers to a test point on the printed circuit board.

4-2 Camera Unit Adjustment

- Refer to page 23 and 24 for the test points and adjusting controls.

Caution : Do not set the white balance during adjustment.

Steps denoted by shading need not be performed for pick-up tube replacement only.

(1) +4.8V/+8.6V adjustment

Test point :	TP002(+4.8V)	Deflection board
Adjust :	VR001(+4.8V/+8.6V)	Deflection board

- Connect the digital voltmeter to TP002.
- Adjust VR001 for 4.8V ± 0.01V.

(2) 4.43MHz adjustment

Test point :	TP009(VCO)	Process board
	TP010(SC)	Process board
Adjusts :	CT003(4.43MHz ADJ)	Process board
	L015(VCO ADJ)	Process board

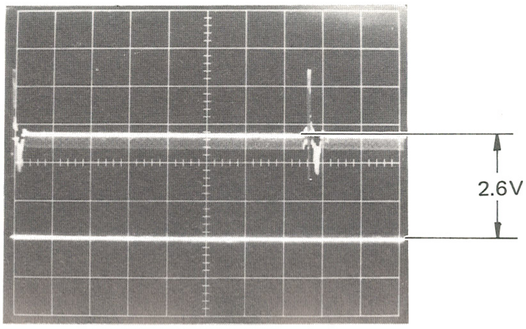
- Connect the frequency counter to TP010.
- Adjust CT003 for 4.43361875MHz ±10Hz.
- Connect the digital voltmeter to TP009.
- Adjust L015 for 3.0V ± 0.2V.

Steps denoted by shading need not be performed for pick-up tube replacement only.

(3) Horizontal hold adjustment

Test point :	TP004 (AFC)	Deflection board
Adjust :	VR009 (H.HOLD)	Deflection board

- Connect the oscilloscope to TP004.
- Trigger the oscilloscope at V.rate. (Use TP007 on deflection board)
- - Adjust VR009 for 2.6V ±0.1V. (Fig. 4-2-1)



1V/DIV,2msec/DIV

Fig. 4-2-1

(4) Target adjustment

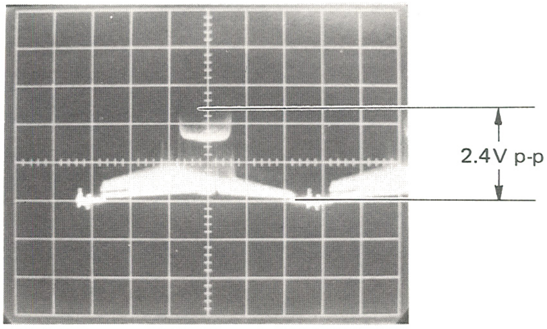
Test point :	TP006 (TARGET)	Deflection board
Adjust :	VR007(TARGET)	Deflection board

- Connect the digital voltmeter to TP006.
- Adjust VR007 so that the voltage is equal to 51.4V ±0.5V.

(5) Beam current adjustment

Test point :	TP001(PREAMP OUT)	Process board
Adjust :	VR011(BEAM)	Deflection board

- Connect the oscilloscope to TP001.
- Trigger the oscilloscope at H.rate. (Use TP013 on process board)
- Aim the camera at the scene which contains a high intensity object and turn the iris Close/Auto/Open control on the side of the camera fully clockwise. (OPEN)
- Adjust VR011 until the waveform is clipped at 2.4 Vp-p ± 0.1Vp-p. (Fig. 4-2-2)
  If the signal does not increase up to 2.4 Vp-p, aim the camera at a brighter object.
- Reset the iris Close/Auto/Open control to center (AUTO) position.



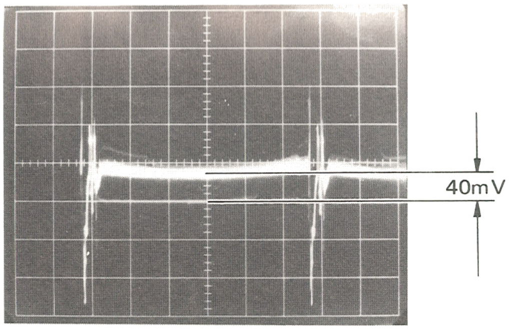
1V/DIV,10μsec/DIV

Fig. 4-2-2

(6) Bias light adjustment

Test point :	TP001(PREAMP OUT)	Process board
Adjust :	VR010(BIAS LIGHT)	Deflection board

- Cap on the lens.
- Connect the oscilloscope to TP001.
- Trigger the oscilloscope at H.rate. (Use TP013 on process board)
- Adjust VR010 so that the bias current is 40mV ± 10mV. (Fig. 4-2-3)
  Note : If there is bias light (current) shading, adjust the level at the center of the waveform.



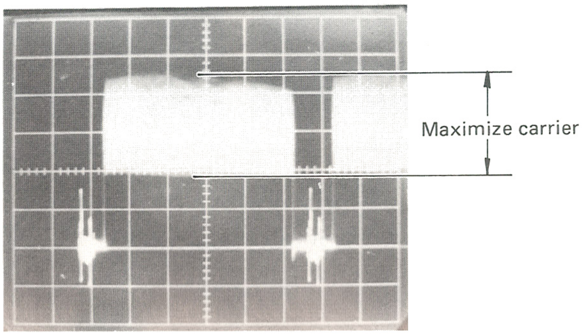
50mV/DIV, 10μsec/DIV

Fig. 4-2-3

(7) Focus coarse adjustment

Test point :	TP001(PREAMP OUT)	Process board
Adjust :	VR015 (FOCUS)	Deflection board

- Aim the camera at the white chart.
- Connect the oscilloscope to TP001 .
- Trigger the oscilloscope at H. rate. (Use TP013 on process board.)
- Adjust VR015 so that the carrier (4.3MHz) on the center portion of the pre video signal becomes maximum. (Fig. 4-2-4)



0.2V/DIV, 10μsec/DIV

Fig. 4-2-4

(8) Rotation adjustment

Test point :	TR001(PREAMP OUT)	Process board
Adjust :	Pick-up Tube	

- Remove two screws holding the pick-up tube socket shield cases and two ground leads and remove the shield case A and B .
- Reinstall two ground leads for deflection and process board.
- Loosen the pick-up tube holding screw. (Fig. 4-2-5)

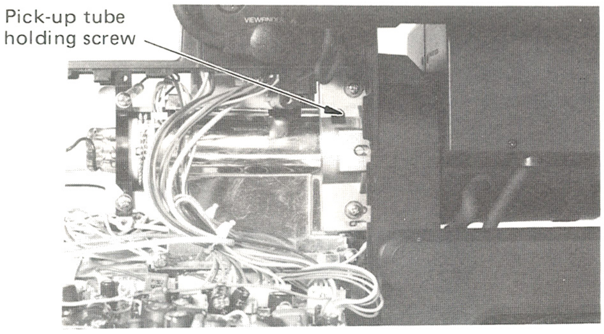
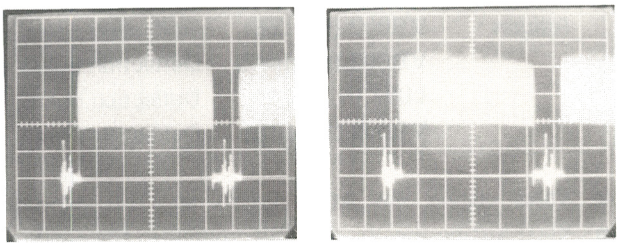


Fig. 4-2-5

- Aim the camera at the white chart.
- Connect the oscilloscope to TP001.
- Trigger the oscilloscope at H. rate. (Use TP013 on process board)
- Rotate the pick-up tube by means of the tube socket (CAUTION 1.5KV) so that the beat during the horizontal period becomes minimum. (Fig. 4-2-6)
- Carefully tighten the pick-up tube holding screw.



NO GOOD GOOD

0.2V/DIV, 10μsec/DIV

Fig. 4-2-6

(9) Backfocus adjustment

Adjust :	Backfocus adjusting pin
Observe :	Color monitor

- Set the AGC switch to OFF position.
- Set the YL ON/OFF switch to ON position.
- Aim the camera at an dark object further than 6 feet (2m) from the camera.
- Turn the iris Close/Auto/Open control fully clockwise (OPEN).
- Loosen two backfocus fixing screws slightly. (Fig. 4-2-7)
- Zoom in (close up/telephoto) and adjust the lens focus.
- Zoom out (wide angle) and adjust the focus by turning the backfocus adjusting pin. (Fig. 4-2-7)
- Zoom in again and adjust the focus by turning the lens focus.
- Zoom out again and adjust the focus by turning the backfocus adjusting pin.
- Repeat this procedure until the focus tracks throughout the zoom range.
- Tighten two backfocus fixing screws.
- Reset the iris Close/Auto/Open control to the center position (AUTO).

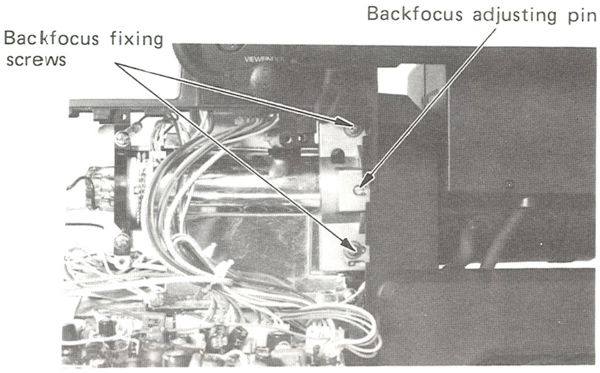
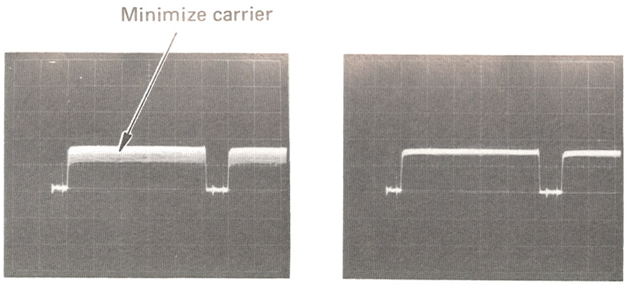


Fig. 4-2-7

(10) Horizontal size, horizontal linearity and vertical size adjustment

Test points :	TP002 (YH)	Process board
	TP001(PREAMP OUT)	Process board
Adjusts :	VR002 (H SIZE)	Deflection board
	VR003 (H LIN-2)	Deflection board
	L007 (H LIN-1)	Deflection board
	VR005 (V SIZE)	Deflection board

- Keep setting the AGC switch to OFF position.
- Keep setting the YL ON/OFF switch to ON position.
- Aim the camera at the white chart.
- Connect the oscilloscope to TP002.
- Trigger the oscilloscope at H.rate. (Use TP013 on process board)
- Adjust VR002 so that the carrier (4.3MHz) on the center portion of the YH signal at TP002 is minimum. (Fig. 4-2-8)

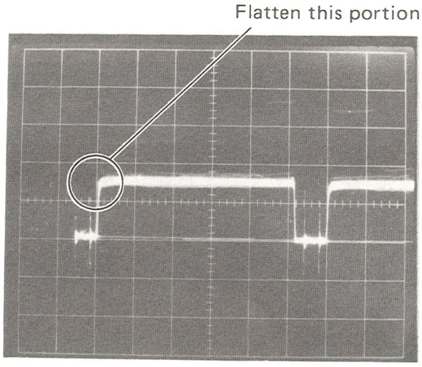


NO GOOD GOOD

0.2V/DIV, 10μsec/DIV

Fig. 4-2-8

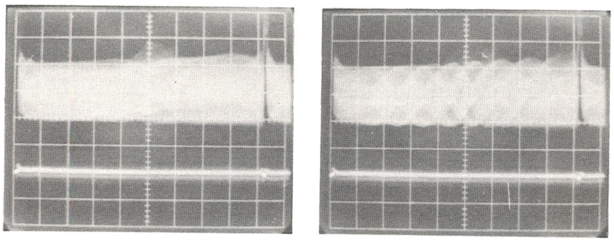
- Adjust VR003 so that the starting portion of YH signal at TP002 is flat. (Fig. 4-2-9)
- Adjust L007 so that the carrier (4.3MHz) on the YH signal is minimum.
- Repeat adjusting L007 and VR003 until the carrier on the YH signal is minimum, the starting portion of YH signal is flat and picture has minimum disturbance on the left side.



0.2V/DIV, 10μsec/DIV

Fig. 4-2-9

- Connect the oscilloscope to TP001.
- Trigger the oscilloscope at V.rate. (Use TP012 on process board)
- Adjust VR005 for minimum beat during the vertical period. (Fig. 4-2-10)



GOOD NO GOOD

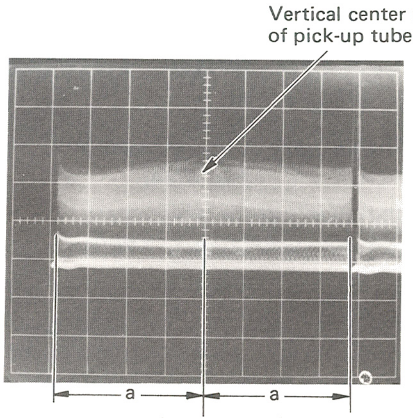
0.2V/DIV, 2msec/DIV

Fig. 4-2-10

(11) Vertical centering adjustment

Test point :	TP001(PREAMP OUT)	Process board
Adjust :	VR004 (H CENT)	Deflection board
	VR006 (V CENT)	Deflection board

- Keep setting the AGC switch to OFF position.
- Keep setting the YL ON/OFF switch to ON position.
- Aim the camera at the white chart.
- Connect the oscilloscope to TP001.
- Trigger the oscilloscope at V.rate. (Use TP012 on process board)
- Turn VR004 fully clockwise.
- The optical black and arrow marker appear on the right side of the picture.
- While observing the waveform, adjust VR006 so that the marker which shows the vertical center of pick-up tube positions at the center of video signal waveform in vertical rate. (Fig. 4-2-11)



0.2V/DIV, 2msec/DIV

Fig. 4-2-11

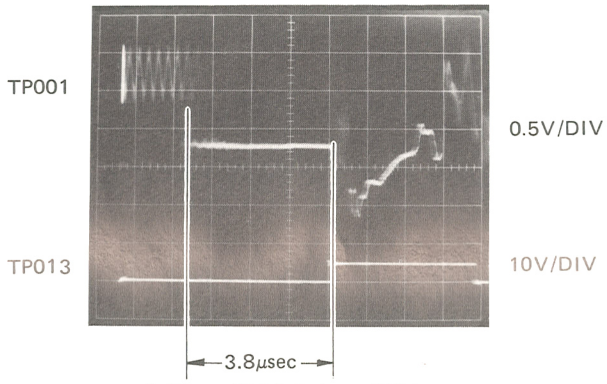
Note : When adjust the vertical centering using with the underscanning monitor, adjust VR006 so that the arrow marker shows the vertical center of the monitor.

- Turn back VR004 until the optical black and arrow marker disappear.

(12) Horizontal centering adjustment

Test point :	TP001(PREAMP OUT)	Process board
	TP013 (Hs)	Process board
Adjust :	VR004 (H CENT)	Deflection board

- Aim the camera at the white chart.
- Connect the oscilloscope to TP001 and TP013.
- Trigger the oscilloscope at H.rate. (Use TP013 on process board)
- Expand the horizontal blanking period on the oscilloscope.
- Adjust VR004 until the optical black width is 3.8 μsec ± 0.1 μsec. (Fig. 4-2-12)
  If the falling edge of the waveform corresponding to the picture is noisy, adjust for the middle.



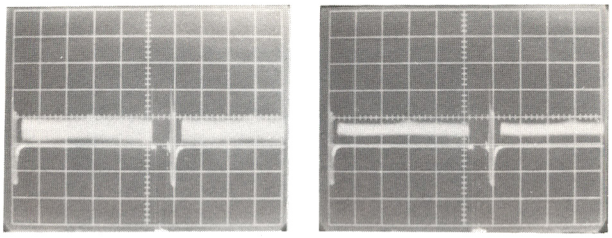
A:10μsec/DIV, B:1μsec/DIV

Fig. 4-2-12

(13) Bias light shading (Bs) correction and Y pedestal adjustment

Test point :	TP008 (PAL OUT)	Process board
Adjusts :	VR012 (Bs V SAW)	Deflection board
	VR013 (Bs V PARA)	Deflection board
	VR013 (Bs H SAW)	Correction board
	VR014 (Bs H PARA)	Correction board
	VR014 (Y PED)	Deflection board

- Set the AGC switch to ON position.
- Keep setting the YL ON/OFF switch to ON position.
- Cap on the lens.
- Connect the oscilloscope to TP008.
- Trigger the oscilloscope at H.rate. (Use TP013 on process board)
- Turn VR014 on deflection board fully clockwise.
- Adjust VR012 and VR013 so that the top portion of dark signal waveform becomes as narrow as possible. (Fig. 4-2-13)

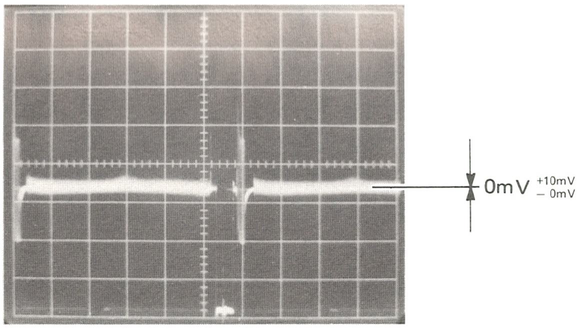


NO GOOD GOOD

0.1V/DIV, 10μsec/DIV

Fig. 4-2-13

- Adjust VR013 and VR014 on Correction board so that the dark signal waveform becomes flat.
- Adjust VR014 on deflection board so that the pedestal level at TP008 becomes 0mV $^{+10mV}_{-0mV}$. (Fig.4-2-14)
- Confirm that the pedestal level does not change by operating AGC switch ON/OFF. If changed, readjust VR014 on deflection board so that the pedestal level does not change by operating AGC switch ON/OFF.



0.1V/DIV, 10μsec/DIV

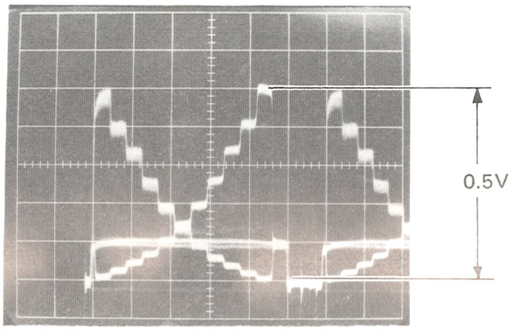
Fig. 4-2-14

Steps denoted by shading need not be performed for pick-up tube replacement only.

(14) AIC level adjustment

Test point :	TP003 (TRACKING)	Process board
Adjust :	VR004 (AIC SET)	Process board

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP003.
- Trigger the oscilloscope at H.rate. (Use TP013 on process board)
- Adjust VR004 for 0.5V ± 20mV from the blanking level to the top step of the gray scale waveform. (Fig. 4-2-15)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-15

(15) AGC/MAN gain adjustment

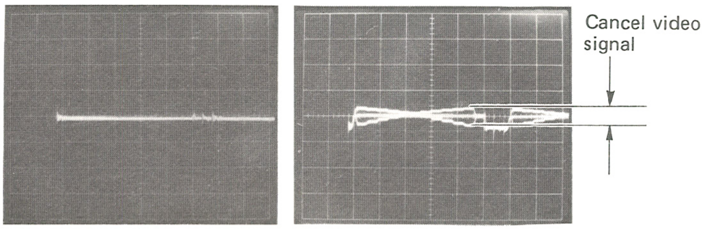
Test point :	TP006 (YL)	Process board
Adjusts :	VR001 (MAN GAIN)	Process board
	VR002 (AGC SET)	Process board

- Keep setting the YL ON/OFF switch to ON position.
- Keep setting the AGC switch to ON position.
- Aim the camera at the gray scale chart.
- Turn VR005 fully clockwise.
- Connect the oscilloscope to TP006.
- Trigger the oscilloscope at H.rate. (Use TP013 on process board)
- Adjust VR002 for 0.5V ± 20mV from the blanking level to the top step of the gray scale waveform.
- Change the AGC switch position to OFF.
- Adjust VR001 for 0.5V ± 20mV from the blanking level to the top step of the gray scale waveform at TP006.
- Reset the AGC switch to ON position.

(16) Vertical edge balance adjustment

Test point :	TP007 (V EDGE)	Process board
Adjust :	VR013 (V EDGE BALANCE)	Process board

- Keep setting the AGC switch to ON position.
- Keep setting the YL ON/OFF switch to ON position.
- Aim the camera at the gray scale chart.
- Connect the oscilloscope to TP007.
- Trigger the oscilloscope at H.rate. (Use TP013 on process board)
- Adjust VR013 to cancel the video signal. (Fig. 4-2-16)



GOOD NO GOOD

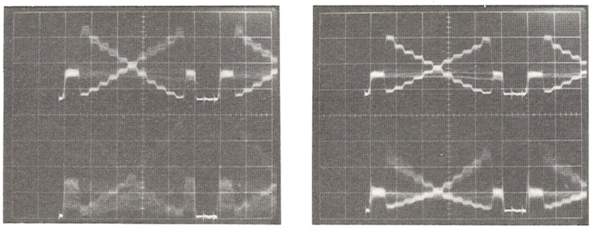
0.1V/DIV, 10μsec/DIV

Fig. 4-2-16

(17) R and B signal separation adjustment

Test points :	Pin 1 of CN007 (R)	Process board
	Pin 3 of CN007 (B)	Process board
Adjusts :	CT001 (Rc/Bc SEPARATION-1)	Process board
	VR006 (Rc/Bc SEPARATION-2)	Process board

- Keep setting the AGC switch to ON position .
- Set the YL ON/OFF switch to OFF position.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to pins 1 and 3 of CN007.
- Trigger the oscilloscope at H.rate. (Use TP013 on process board)
- Adjust CT001 for minimum waveform flicker (especially B signal at pin 3 of CN007). (Fig. 4-2-17)
- Adjust VR006 for the same condition.
- Repeat adjusting CT001 and VR006 until the flicker in both waveform is minimum.



NO GOOD GOOD

0.2V/DIV, 10μsec/DIV

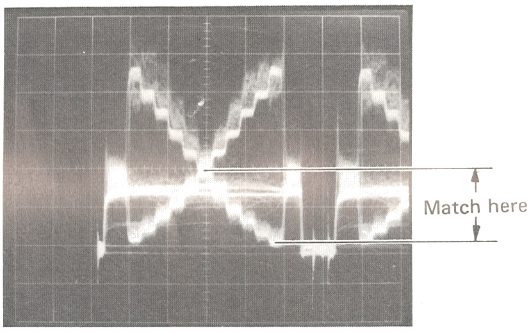
Fig. 4-2-17

(18) B gain and YL pedestal preset adjustment

Test points :	Pin 3 of CN007 (B)	Process board
	TP006 (YL)	Process board
Adjusts :	VR007 (Rc/Bc GAIN)	Process board
	VR005 (YL PED)	Process board

- Keep setting the AGC switch to ON position.
- Keep setting the YL ON/OFF switch to OFF position.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP013 and pin 3 of CN007.
- Trigger the oscilloscope at H.rate. (Use TP013 on process board)
- Set the color adjustment control on the side of the camera to the center position.
- Turn VR010, VR011, VR012, VR014, VR015 and VR016 on process board to their mechanical center.
- Overlay the B signal and YL signal on the oscilloscope, and adjust VR007 so that the signal level between the black chip (zero step) and fifth step (crossing step) of the gray scale waveform match. (Fig. 4-2-18)

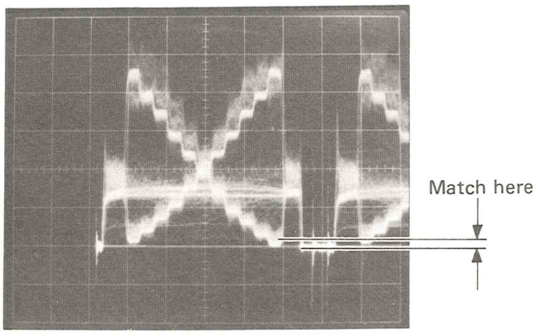
  Note : Before adjusting VR007, if the gray scales black chip of YL signal is suppressed, turn VR005 until the black chip of YL signal can be observed.



0.1V/DIV, 10μsec/DIV

Fig. 4-2-18

- Next, adjust VR005 so that the pedestal level of YL signal matches that of B signal. (Fig. 4-2-19)



0.1V/DIV, 10μsec/DIV

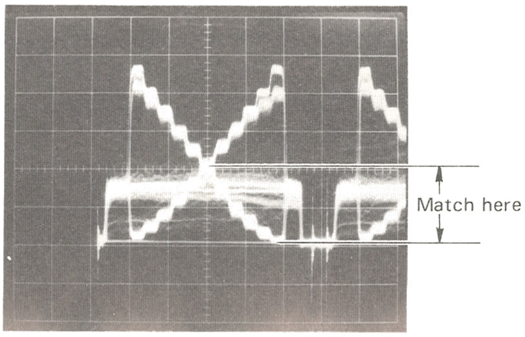
Fig. 4-2-19

(19) R gain and R pedestal preset adjustment

Test points :	Pin 1 of CN007 (R)	Process board
	TP006 (YL)	Process board
Adjusts :	VR017 (R GAIN)	Process board
	VR018 (R PED)	Process board

- Keep setting the AGC switch to ON position.
- Keep setting the YL ON/OFF switch to OFF position.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP006 and pin 1 of CN007.
- Trigger the oscilloscope at H.rate. (Use TP013 on process board)
- Overlay the R signal and YL signal on the oscilloscope, and adjust VR017 so that the signal level between the black chip (zero step) and fifth step (crossing step) of the gray scale waveform match. (Fig. 4-2-20)

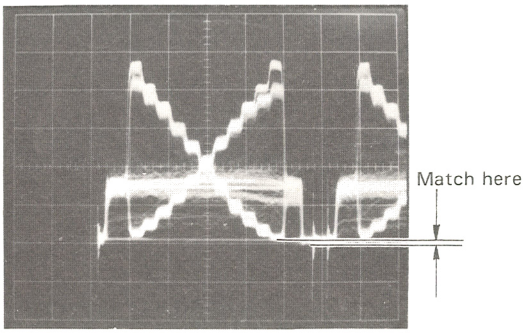
  Note : Before adjusting VR018, if the gray scales black chip of R signal is suppressed, turn VR018 until the black chip of R signal can be observed.



0.1V/DIV, 10μsec/DIV

Fig. 4-2-20

- Next, adjust VR018 so that the pedestal level of R signal matches that of YL signal. (Fig. 4-2-21)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-21

- Repeat adjusting VR017 and VR018 until the signal level between the black chip (zero step) and fifth step (crossing step), and pedestal level of gray scale waveform match.

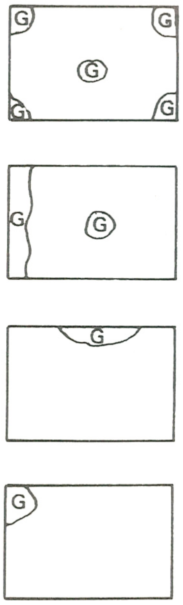
(20) Dynamic focus adjustment

Adjusts :	VR015 (FOCUS)	Deflection board
	VR009 (DF V.PARA)	Correction board
	VR010 (DF V.SAW)	Correction board
	VR011 (DF H.PARA)	Correction board
	VR012 (DF H.SAW)	Correction board
Observe :	Color monitor	

- Keep setting the AGC switch to ON position.
- Set the YL ON/OFF switch to ON position.
- Aim the camera at the white chart.
- Turn RED SIGNAL SHADING VR001 to VR004 and BLUE SIGNAL SHADING VR005 to VR008 on Correction board to their mechanical center.
- Observe the color monitor, and adjust VR015 for minimum green in the center and maximum magenta (red) throughout the picture area.
- Increase the color monitors chroma gain for better viewing.
- Make sure that the color monitor is converged properly.
- Adjust VR009 to VR012 to minimize the green tint in the corners and edges of picture.

Note : 1. Overall focus is affected by the dynamic focus adjustment so readjust VR015 occasionally while performing the dynamic focus adjustment

2. The object of this adjustment is to optimize overall focus, especially at the picture edges and corners.



H. PARABOLA VR011
V. PARABOLA VR009

H. SAWTOOTH VR012
H. PARABOLA VR011

V. SAWTOOTH VR010

H. SAWTOOTH VR012
V. SAWTOOTH VR010

Fig. 4-2-22

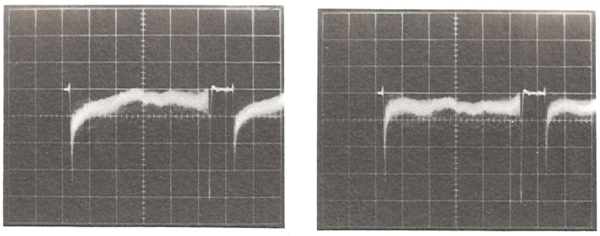
(21) Signal shading adjustment

Test points :	Pin 1 of CN007 (R)	Process board
	Pin 3 of CN007 (B)	Process board
Adjusts :	VR001 (R-V.PARA)	Correction board
	VR002 (R-V.SAW)	Correction board
	VR003 (R-H.PARA)	Correction board
	VR004 (R-H.SAW)	Correction board
	VR005 (B-V.PARA)	Correction board
	VR006 (B-V.SAW)	Correction board
	VR007 (B-H.PARA)	Correction board
	VR008 (B-H.SAW)	Correction board

- Keep setting the AGC switch to ON position.
- Keep sttting the YL ON/OFF switch to ON position.
- Aim the camera at the white chart.

■ R signal shading adjustment

- Connect the oscilloscope to pin 1 of CN007 (R).
- Trigger the oscilloscope at H.rate. (Use TP013 on process board)
- Adjust VR003 and VR004 to make the waveform as flat as possible. (Fig. 4-2-23)

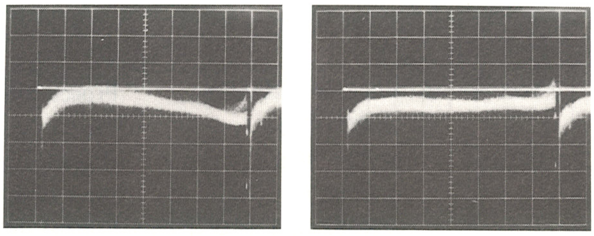


NO GOOD GOOD

0.1V/DIV, 10μsec/DIV

Fig. 4-2-23

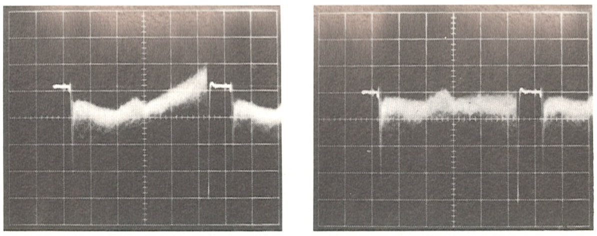
- Trigger the oscilloscope at V.rate. (Use TP012 on process board)
- Adjust VR001 and VR002 to make the waveform as flat as possible. (Fig. 4-2-24)



0.1V/DIV, 10μsec/DIV
Fig. 4-2-24

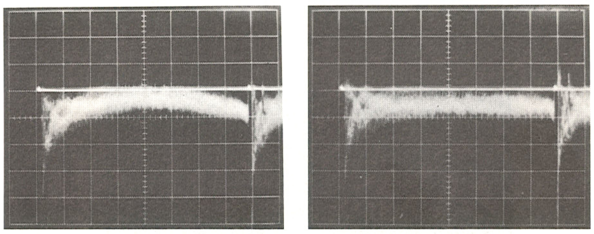
■ B signal shading adjustment

- Connect the oscilloscope to pin 3 of CN007 (B).
- Trigger the oscilloscope at H.rate. (Use TP013 on process board)
- Adjust VR007 and VR008 to make the waveform as flat as possible. (Fig. 4-2-25)



0.1V/DIV, 10μsec/DIV
Fig. 4-2-25

- Trigger the oscilloscope at V.rate. (Use TP012 on process board)
- Adjust VR005 and VR006 to make the waveform as flat as possible. (Fig. 4-2-26)



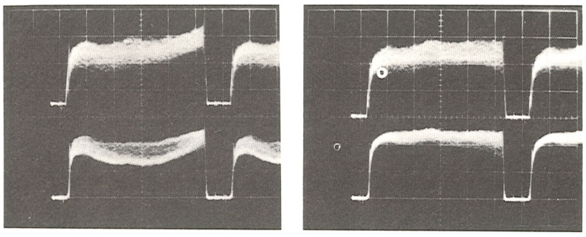
0.1V/DIV, 10μsec /DIV
Fig. 4-2-26

Note:
1. If color shading areas still remain after shading adjustment, repeat dynamic focus adjustment and signal shading adjustment.
2. If color shading areas still remain after above adjustments, proceed (22) Beam alignment adjustment following next. But if not, skip the beam alignment adjustment.

(22) Beam alignment adjustment

Test points :	Pin 1 of CN007 (R)	Process board
	Pin 3 of CN007 (B)	Process board
Adjust :	VR015 (Focus)	Deflection board
	Alignment magnets	Coil assembly
Observe :	Color monitor	

- Keep setting the AGC switch to ON position.
- Set the YL ON/OFF switch to OFF position.
- Aim the camera at the white chart.
- Connect the oscilloscope to pins 1 (R) and 3 (B) of CN007.
- Trigger the oscilloscope at H.rate. (Use TP013 on Process board)
- Turn DYNAMIC FOCUS VR009 to VR012 to their mechanical center.
- Also turn RED SIGNAL SHADING VR001 to VR004 and BLUE SIGNAL SHADING VR005 to VR008 to their mechanical center.
- Adjust VR015 so that the center portion of R and B signal waveforms at pin 1 and 3 of CN007 become maximum.



0.2V/DIV, 10μsec/DIV
Fig. 4-2-27

- Set the YL ON/OFF switch to ON position.
- Remove the paint-lock from the alignment magnets. (Fig. 4-2-28)
- Then while watching the color monitor, rotate the alignment magnets for minimum green tint in the center and maximum magenta (red) throughout the picture area. (Fig. 4-2-29)

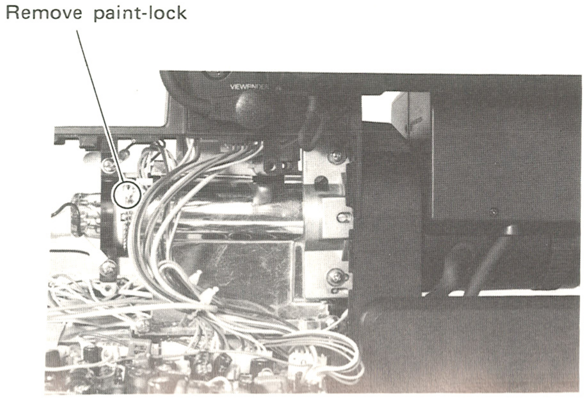
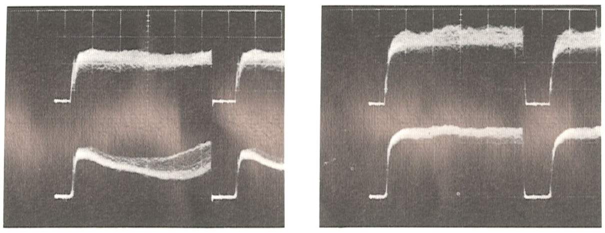


Fig. 4-2-28



NO GOOD

GOOD

0.2V/DIV, 10μsec/DIV

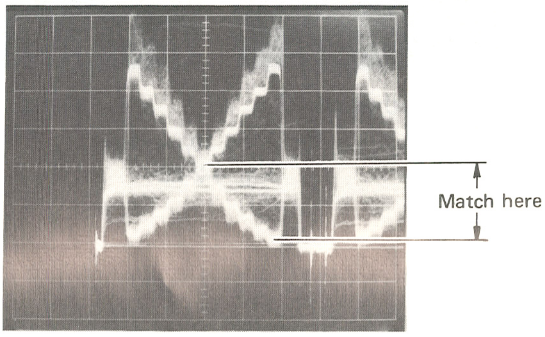
Fig. 4-2-29

- **Lock the alignment magnets using the paint-lock.**
- **Confirm H.centering adjustment refering to page 14.**
- **After this adjustment is completed, readjust dynamic focus (See page 17) and signal shading. (See page 17)**

(23) YL and B signal tracking adjustment

Test points :	Pin 3 of CN007 (B)	Process board
	TP006 (YL)	Process board
Adjusts :	VR007 (Rc/Bc GAIN)	Process board
	VR005 (YL PED)	Process board
	VR012 (B TRACKING-1)	Process board
	VR011 (B TRACKING-2)	Process board
	VR010 (B TRACKING-3)	Process board

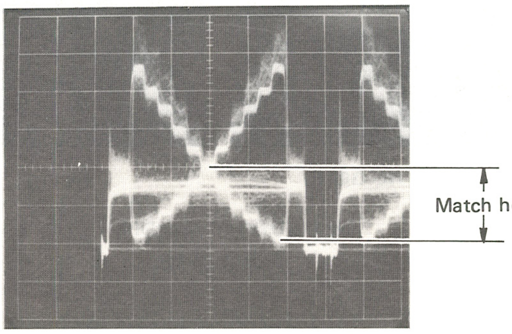
- Keep setting the AGC switch to ON position.
- Set the YL ON/OFF switch to OFF position. position.
- Confirm VR010, VR012 and VR011 are set to their mechanical center.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP006 and pin 3 of CN007.
- Trigger the oscilloscope at H.rate. (Use TP013 on process board)
- Overlay the B signal and YL signal on the oscilloscope, and confirm that the signal level between the black chip (zero step) and fifth step (crossing step) of the gray scale waveforms match. If not, adjust VR007 to match them. (Fig. 4-2-30)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-30

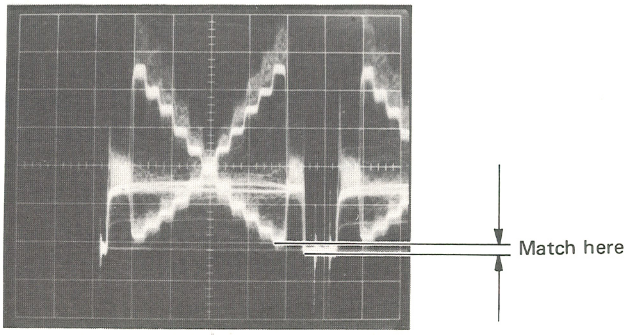
- Adjust VR012 so that each steps of the B signal matches the YL signal in the lower half of the gray scale waveform. (Fig. 4-2-31)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-31

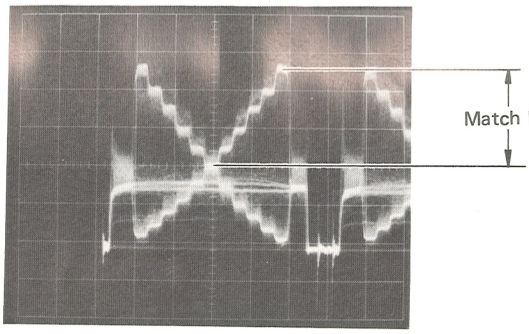
- Adjust VR005 so that the pedestal level of YL signal matches that of B signal. (Fig. 4-2-32)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-32

- Adjust VR010 and VR011 so that each steps of the B signal matches the YL signal in the 5th - 10th step of gray scale waveform. (Fig. 4-2-33)



0.1V/DIV, 10μsec/DIV

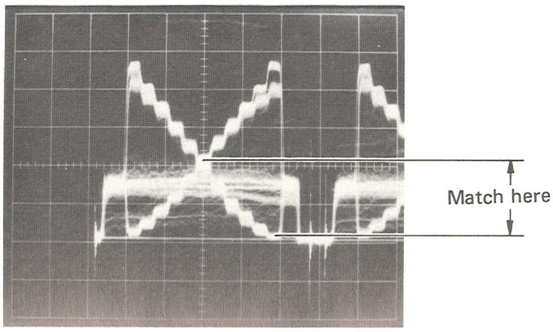
Fig. 4-2-33

- Repeat these steps until the YL and B signal waveforms match.

(24) YL and R signal tracking adjustment

Test points :	Pin 1 of CN007 (R)	Process board
	TP006 (YL)	Process board
Adjusts :	VR017 (R GAIN)	Process board
	VR018 (R PED)	Process board
	VR016 (R TRACKING-1)	Process board
	VR014 (R TRACKING-2)	Process board
	VR015 (R TRACKING-3)	Process board

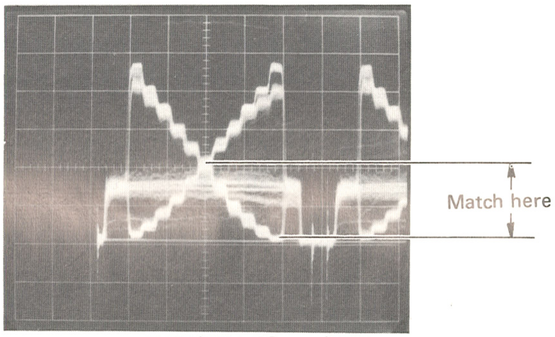
- Keep setting the AGC switch to ON position.
- Keep setting the YL ON/OFF switch to OFF position.
- Confirm that VR016, VR015 and VR014 are aet to their mechanical center.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP006 and pin 1 of CN007.
- Trigger the oscilloscope at H.rate. (Use TP013 on process board)
- Overlay the R signal and the YL signal on the oscilloscope and confirm that the signal level between the black chip (zero step) and fifth step (crossing step) of the gray scale waveforms match. If not, adjust VR017 to match them. (Fig. 4-2-34)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-34

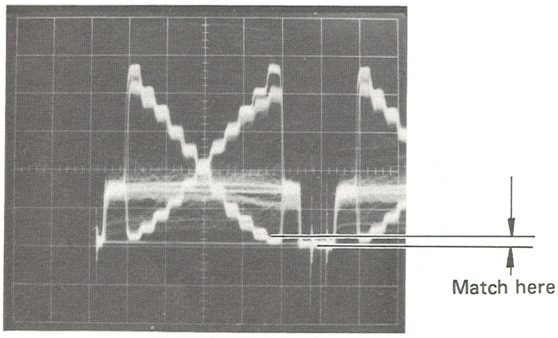
- Adjust VR016 so that each steps of the R signal matches the YL signal in the lower half of the gray scale waveform. (Fig. 4-2-35)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-35

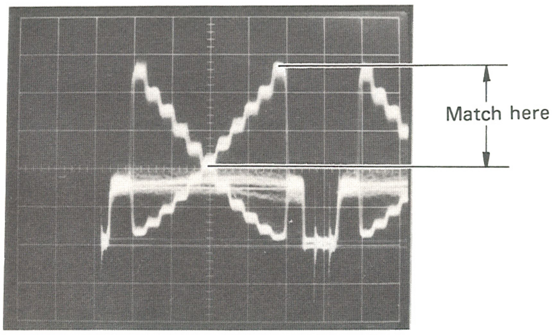
- Adjust VR018 so that the pedestal level of R signal matches that of YL signal. (Fig. 4-2-36)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-36

- Adjust VR014 and VR015 so that each steps of the R signal matches the YL signal in the 5th - 10th step of gray scale waveform. (Fig. 4-2-37)



0.1V/DIV, 10μsec/DIV

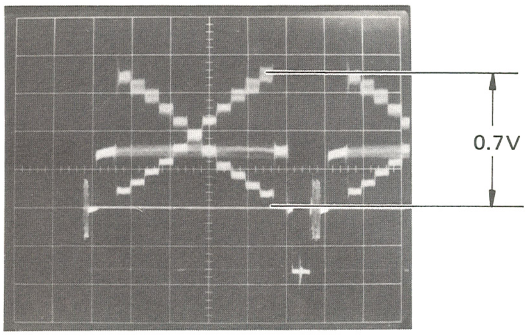
Fig. 4-2-37

- Repeat these steps until the YL and R signal waveforms match.
- Connect the oscilloscope to TP008.
- Adjust VR007 so that the carrier on the PAL output at TP008 becomes minimum.
- Adjust VR017 for the same condition.
- Adjust VR012, VR011, VR010, VR016, VR014 and VR015 for the same condition.

(25) Y gain adjustment

Test point :	TP008 (PAL)	Process board
Adjust :	VR003 (Y GAIN)	Process board

- Keep setting the AGC switch to ON position.
- Reset the YL ON/OFF switch to ON position.
- Aim the camera at logarithmic gray scale chart.
- Connect the oscilloscope to TP008.
- Trigger the oscilloscope at H.rate. (Use TP013 on process board)
- Adjust VR003 for 0.7V ± 50mV from the blanking level to the top step of the gray scale waveform. (Fig. 4-2-38)



0.2V/DIV, 10μsec/DIV

Fig. 4-2-38

Steps denoted by shading need not be performed for pick-up tube replacement only.

(26) Chroma phase, gain and burst level, phase adjustment

Adjusts :	VR008(CHROMA GAIN)	Process board
	CT002(CHROMA PHASE)	Process board
	VR009(BURST LEVEL)	Process board
	VR019(BURST PHASE)	Process board
	VR020(R CHROMA CLIP)	Process board
Observe :	Vectorscope	

- Keep setting the AGC switch to ON position.
- Keep setting the YL ON/OFF switch to ON position.
- Aim the camera at the color chart.
- Connect the PAL output to a terminated vectorscope.
- Adjust VR019 so that the phase between two bursts becomes 90° each other on the vectorscope. (Fig. 4-2-39)

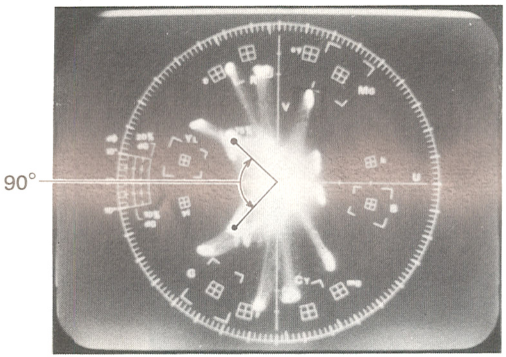


Fig. 4-2-39

- Adjust VR009 so that the burst level is 75% on the vectorscope (Fig. 4-2-40) and confirm that the burst level is 0.3Vp-p ± 30mVp-p at TP008 on process board. (Fig. 4-2-41)

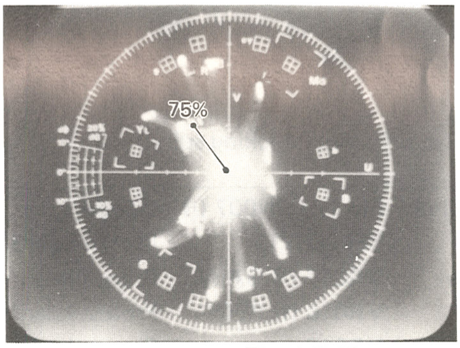
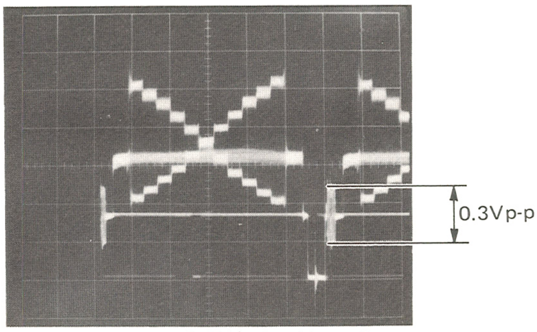


Fig. 4-2-40



0.2V/DIV, 10μsec/DIV

Fig. 4-2-41

Set the vectorscope to the NTSC mode.
Adjust the phase control on the vectorscope so that the two burst vectors become one above another at 135° on the vectorscope. (Fig. 4-2-42)

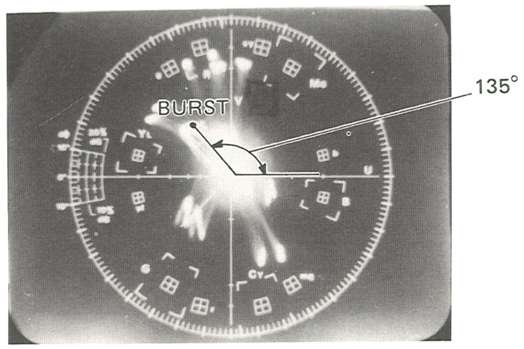


Fig. 4-2-42

- Turn VR020 fully counterclockwise.
- Turn VR002 (COLOR BALANCE) on the side of the camera fully counterclockwise (RED).
- Adjust CT002 so that the two RED vectors become one above another on the vectorscope. (Fig. 4-2-43)
- Adjust VR008 so that the RED vector on the vectorscope becomes 185% as compares to the burst signal. (Fig. 4-2-43)

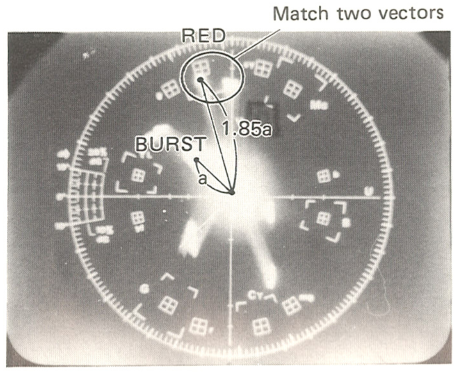

Match two vectors
RED
1.85a
BURST
a

Fig. 4-2-43

- Adjust VR020 so that the RED vector on the vector scope clips at 225% as compares to the burst signal.
- Reset VR002 (COLOR BALANCE) to the center position.

(27) Character size adjustment

Test point :	TP001	Micon board
Adjust :	VR001 (CHARACTER SIZE)	Micon board

- Press the TIMER/DATE button and the graphics "00.00.00" are displayed on the color monitor and the EVF monitor screen.
- Adjust VR001 so that the end of the graphics position becomes the center of the horizontal period on the monitor. (Fig. 4-2-44)

Steps denoted by shading need not be performed for pick-up tube replacement only.

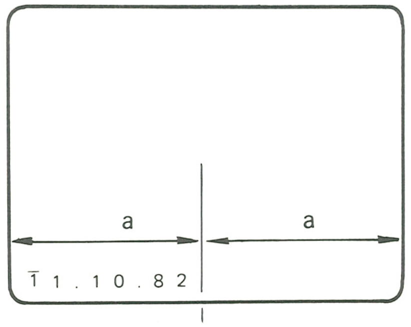


Fig. 4-2-44

4-3 Viewfinder adjustment

- The camera must be completely aligned before viewfinder adjustment is made.
- The conditions and connections for viewfinder adjustment are the same as shown in Fig. 4-1-1 on page 10.
- Refer to page 24 for the adjusting controls and test points.

(1) Picture tilt adjustment

Adjust : Deflection Coil
Observe : Viewfinder

- Keep setting the AGC switch to ON position.
- Keep setting the YL ON/OFF switch to ON position.
- Reduce picture size using VR001 on the deflection board and VL001 on the viewfinder board.
- Aim the camera at the ball chart.
- Make sure the camera is level with the chart.
- Loosen the deflection coil holding screw. (Fig.4-3-1)

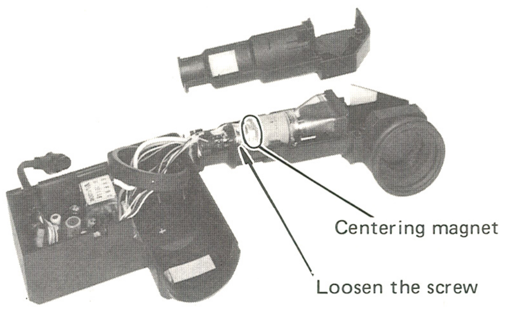
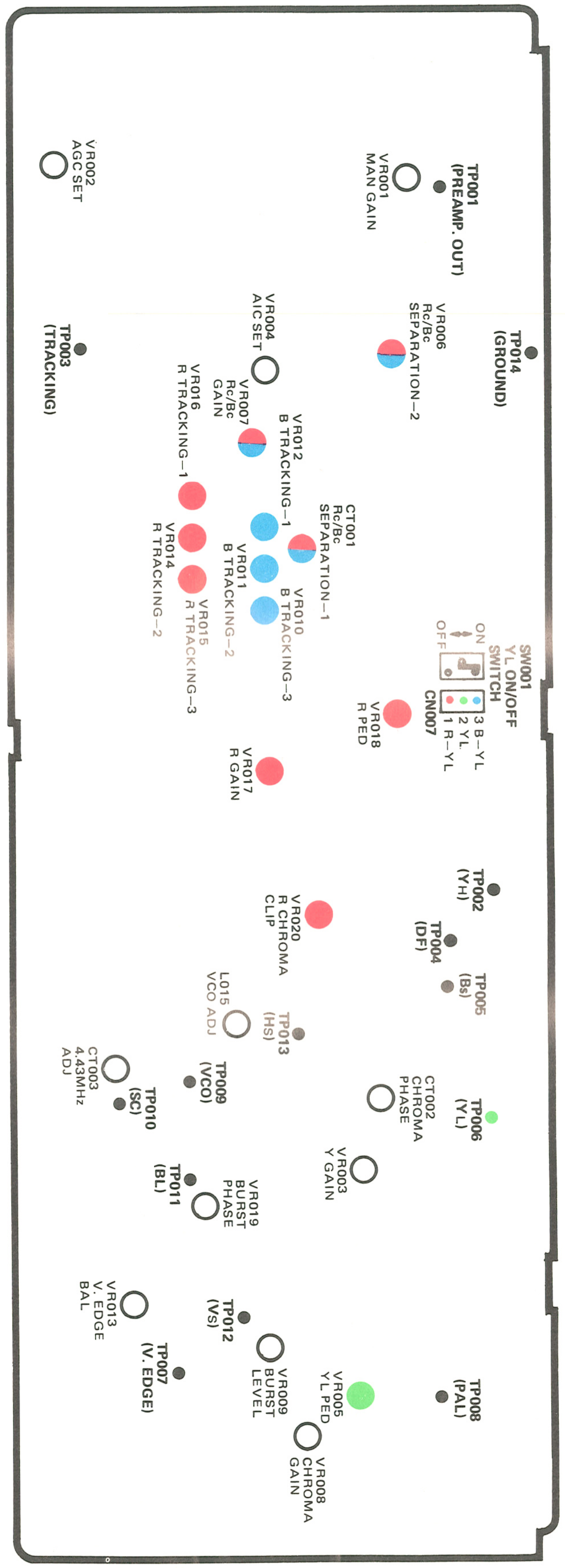

Centering magnet
Loosen the screw

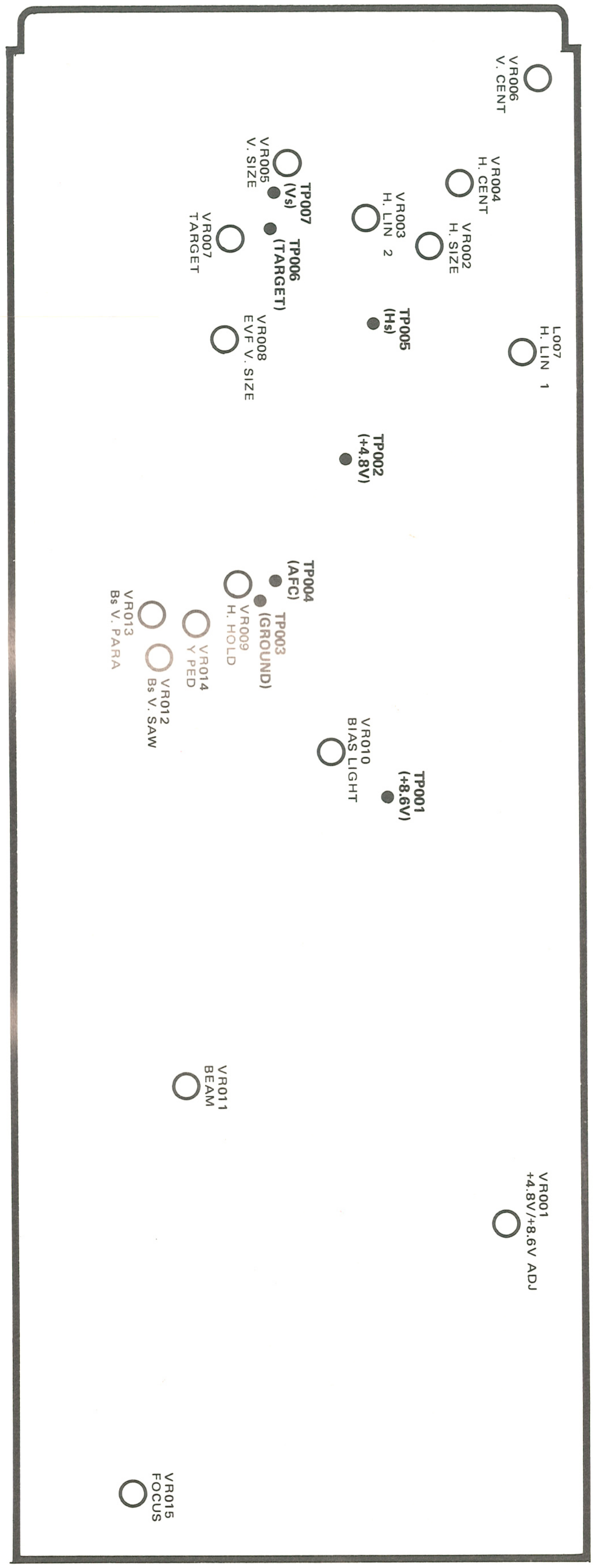
Fig. 4-3-1

- Observe the viewfinder, and turn the deflection coil until the image is straight.
- Tighten the deflection coil holding screw.

LOCATION OF TEST POINTS AND ADJUSTING CONTROLS

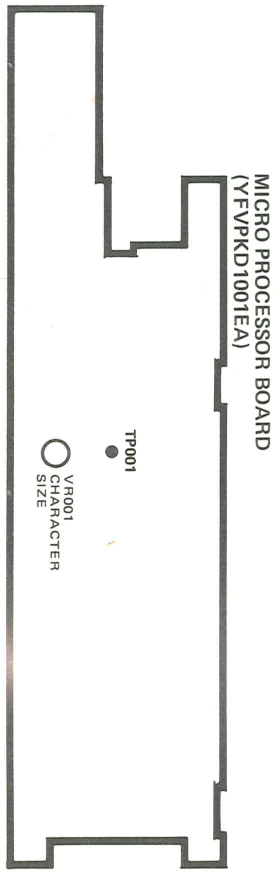

VR002 AGC SET
TP003 (TRACKING)
VR001 MAN GAIN
TP001 (PREAMP. OUT)
TP014 (GROUND)
VR006 Rc/Bc SEPARATION–2
VR004 AIC SET
VR007 Rc/Bc GAIN
VR012 B TRACKING–1
CT001 Rc/Bc SEPARATION–1
VR016 R TRACKING–1
VR014 R TRACKING–2
VR011 B TRACKING–2
VR010 B TRACKING–3
VR015 R TRACKING–3
SW001 YL ON/OFF SWITCH
ON
OFF
CN007
3 B–YL
2 YL
1 R–YL
VR018 R PED
VR017 R GAIN
TP002 (YH)
VR020 R CHROMA CLIP
TP004 (DF)
TP005 (Bs)
L015 VCO ADJ
TP013 (HS)
CT003 4.43MHz ADJ
TP010 (SC)
TP009 (VCO)
CT002 CHROMA PHASE
TP006 (YL)
VR003 Y GAIN
TP011 (BL)
VR019 BURST PHASE
VR013 V. EDGE BAL
TP012 (VS)
TP007 (V. EDGE)
VR009 BURST LEVEL
VR005 YL PED
TP008 (PAL)
VR008 CHROMA GAIN

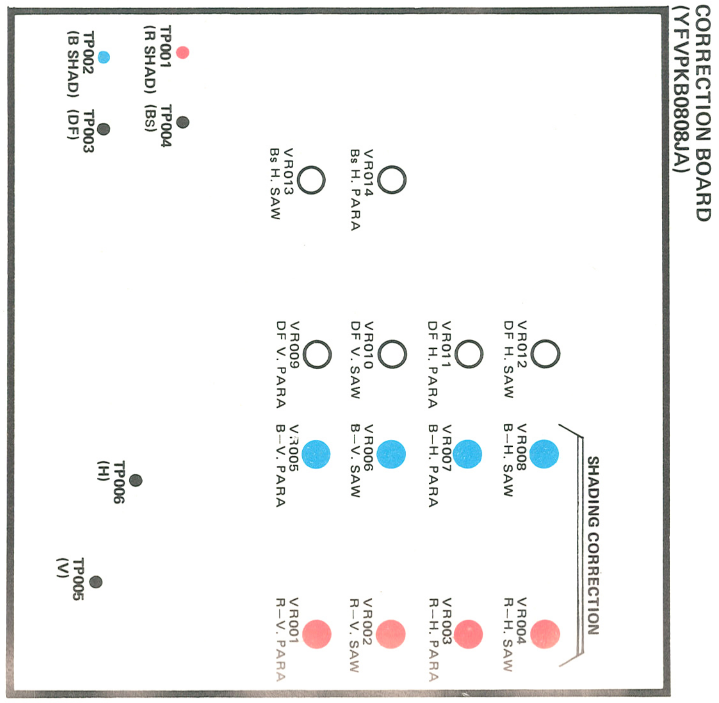
PROCESS BOARD
(YFVPKC1001EA)

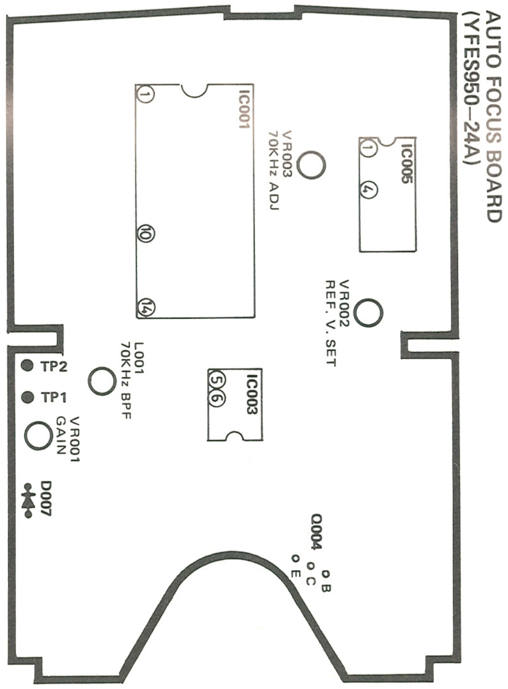

VR006 V. CENT
VR004 H. CENT
VR005 V. SIZE
TP007 (Vs)
VR003 H. LIN 2
VR002 H. SIZE
VR007 TARGET
TP006 (TARGET)
TP005 (Hs)
VR008 EVF V. SIZE
L007 H. LIN 1
TP002 (+4.8V)
TP004 (AFC)
TP003 (GROUND)
VR009 H. HOLD
VR014 Y PED
VR013 Bs V. PARA
VR012 Bs V. SAW
VR010 BIAS LIGHT
TP001 (+8.6V)
VR011 BEAM
VR001 +4.8V/+8.6V ADJ
VR015 FOCUS

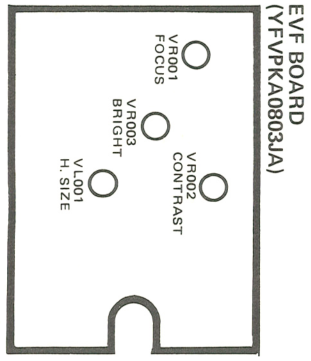
DEFLECTION BOARD
(YFVPKB1001EA)

LOCATION OF TEST POINTS AND ADJUSTING CONTROLS


MICRO PROCESSOR BOARD
(YFVPKD1001EA)
TP001
VR001
CHARACTER SIZE


CORRECTION BOARD
(YFVPKB0808JA)
TP001 (R SHAD)
TP002 (B SHAD)
TP004 (BS)
TP003 (DF)
VR014 Bs H. PARA
VR013 Bs H. SAW
VR012 DF H. SAW
VR011 DF H. PARA
VR010 DF V. SAW
VR009 DF V. PARA
SHADING CORRECTION
VR008 B-H. SAW
VR007 B-H. PARA
VR006 B-V. SAW
VR005 B-V. PARA
VR004 R-H. SAW
VR003 R-H. PARA
VR002 R-V. SAW
VR001 R-V. PARA
TP006 (H)
TP005 (V)


AUTO FOCUS BOARD
(YFES950-24JA)
IC001
IC005
VR003
70KHz ADJ
VR002
REF. V. SET
IC003
L001
70KHz BPF
VR001
GAIN
TP2
TP1
D007
Q004
B
C
E


EVF BOARD
(YFVPKA0803JA)
VR001
FOCUS
VR003
BRIGHT
VR002
CONTRAST
VL001
H. SIZE

(2) Centering magnets adjustment

Adjust :	Centering magnets
Observe :	Viewfinder

- Keep setting the AGC switch to ON position.
- Keep setting the YL ON/OFF switch to ON position.
- Aim the camera at the ball chart.
- Adjust the centering magnets (see Fig. 4-3-1) until the center of picture (raster) comes to the center of the viewfinder screen. (Fig. 4-3-2)

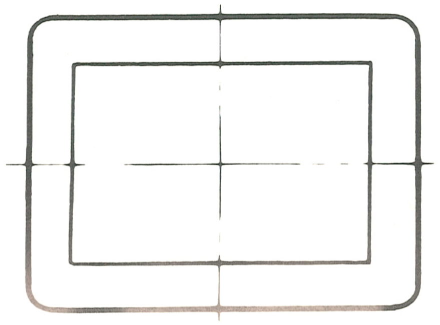


Fig. 4-3-2

(3) EVF V.SIZE and H.SIZE adjustment

Adjusts :	VR008 (EVF V SIZE)	Deflection board
	VL001 (H SIZE)	Viewfinder
Observe :	Viewfinder	

- Aim the camera at the ball chart, and line up the reference arrow head with edge of the raster (blanking) on the viewfinder. (Fig. 4-3-3)
- Keep setting the AGC switch to ON position.
- Keep setting the YL ON/OFF switch to ON position.
- Adjust VL001 to a point where the ball charts edges just disappear on the viewfinder. (Fig. 4-3-3)
- Then adjust VR008 so that the circle in the chart is nearly a true circle.

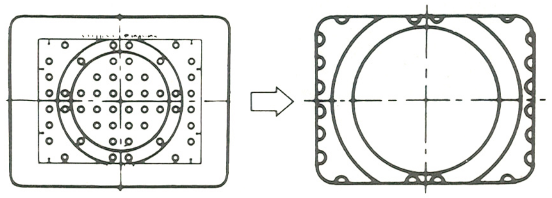


Fig. 4-3-3

Steps denoted by shading need not be performed for pick-up tube replacement only.

(4) Contrast and brightness adjustment

Adjusts :	VR002(CONTRAST)	EVF board
	VR003 (BRIGHT)	EVF board
Observe :	Viewfinder	

- Keep setting the AGC switch to ON position.
- Keep setting the YL ON/OFF switch to ON position.
- Aim the camera at the logarithmic gray scale chart.
- Adjust VR002 and VR003 so that the black-and-white chip gradations will be the same on the viewfinder screen as that on the monitor.

(5) Focus adjustment

Adjust :	VR001 (FOCUS)	EVF board
Observe :	Viewfinder	

- Keep setting the AGC switch to ON position.
- Keep setting the YL ON/OFF switch to ON position.
- Aim the camera at the ball chart.
- Adjust VR001 for best resolution on the viewfinder.

Steps denoted by shading need not be performed for pick-up tube replacement only.

4-4 Auto Focus Lens Adjustment

- Disassemble the lens as described in Section 2 DISASSEMBLY PROCEDURE FOR ADJUSTMENT on page 1.
- Connect two lens connectors to the connectors on the front portion of the camera.
- Adjust the auto focus lens using with completely adjusted camera.
- Refer to page 24 for the adjusting controls and test points.

(1) 70KHz adjustment

Test point : Pin 4 of IC005
Adjust : VR003 (70KHz ADJ)

- Connect jumper wire between pin 10 and pin 14 of IC001.
- Connect jumper wire between base and emitter of Q004.
- Connect frequency counter to pin 4 of IC005.
- Adjust VR003 for 70KHz ± 350Hz.

(2) 70KHz BPF adjustment

Test point : TP1
Adjust : L001 (70KHz BPF)

- Unsolder the shield plate on the auto focus board.
- Connect jumper wire between base and emitter of Q004.
- Connect RC oscillator to cathode of D007.
- Set RC oscillator frequency to 70KHz and set output level of RC oscillator at 2.1V or less.
- Connect oscilloscope to TP1.
- Set oscilloscope at the AC mode.
- Adjust L001 for maximum output.

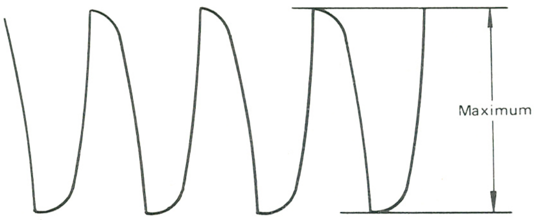


Fig. 4-4-1

(3) REF.V. set adjustment

Test point : Pin 6 of IC003
Adjust : VR002 (REF.V.SET)

- Connect oscilloscope to pin 6 of IC003.
- Adjust VR002 so that output voltage becomes 100mV after 23 msec (at 20°C) from trigger point.
- Select the timing (msec) which is shown at the vertical graduation through the temperature graduation and crosspoint in Fig. 4-4-3.

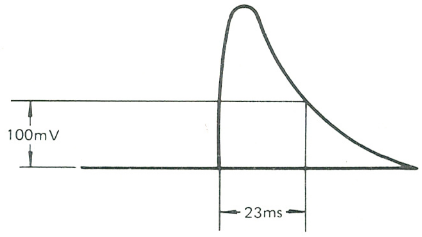


Fig. 4-4-2

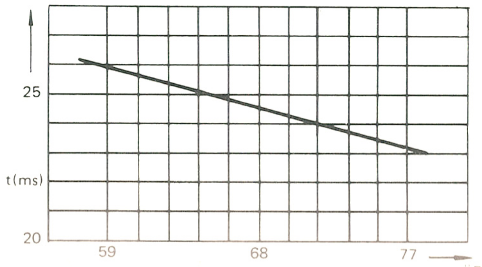


Fig. 4-4-3

(4) Focus ring position sensor adjustment

- Loosen four focus ring position sensor holding screws.
- Aim the camera at the ball chart.
- Set the distance between camera and chart to 3m.
- Set SW001 (AUTO ON/OFF) switch to OFF position.
- Adjust the focus ring position sensor so that input level of pin 7 of IC001 becomes L level and input level of pins 2, 3, 4, 5, and 6 of IC001 become H level.

(5) Gain adjustment

Test point : TP1
Adjust : VR001 (GAIN)

- Set distance between the object and camera to 2m.
- Set SW001 (AUTO ON/OFF) switch to ON position.
- Adjust VR001 so that picture on the monitor becomes best focus.
- Connect oscilloscope to TP1 and confirm that the voltage is approx. 4.4V.

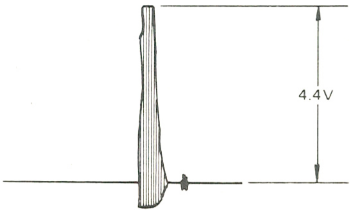


Fig. 4-4-4

MICRO PROCESSOR BOARD REMOVAL

(1) Remove four screws from the bottom and remove the covers

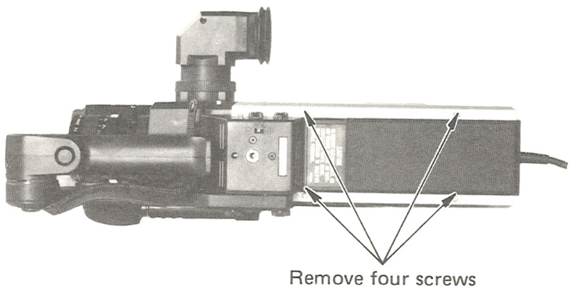

Remove four screws

Fig. 1

(2) Remove three screws on the deflection and process boards and release them.

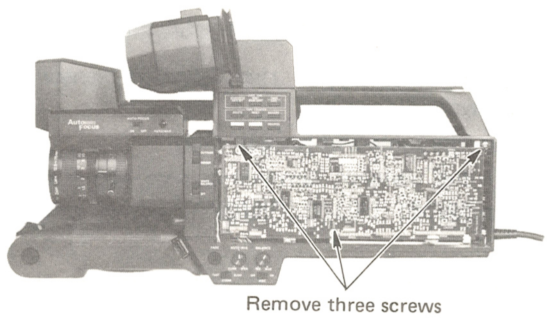

Remove three screws

Fig. 2

(3) Disconnect CN001 from the deflection board.

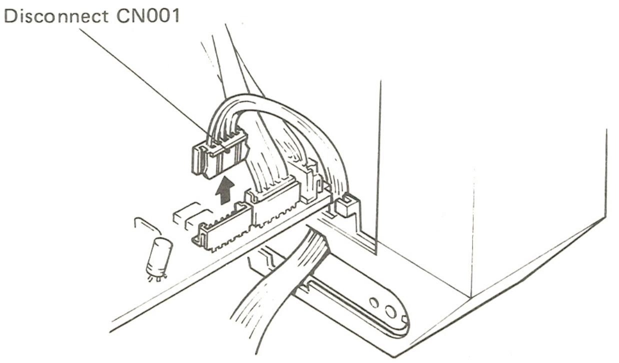

Disconnect CN001

Fig. 3

(4) Loosen two screws on the handle grip and move the grip arm down.

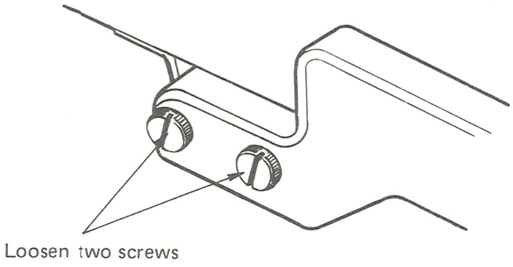

Loosen two screws

Fig. 4

(5) Remove one screw and remove the handle grip from the camera.

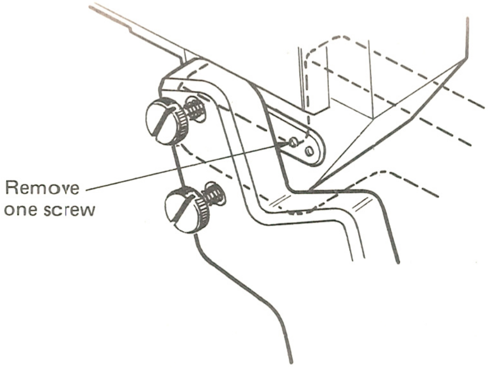

Remove
one screw

Fig. 5

(6) Release locking tabs holding the micro processor board using flat screw driver.

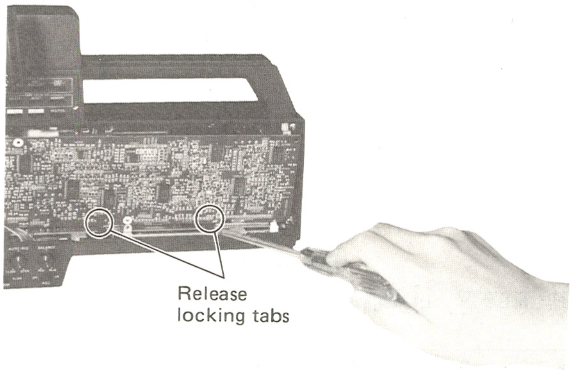

Release
locking tabs

Fig. 6

(7) Remove two knobs on the side of the camera.

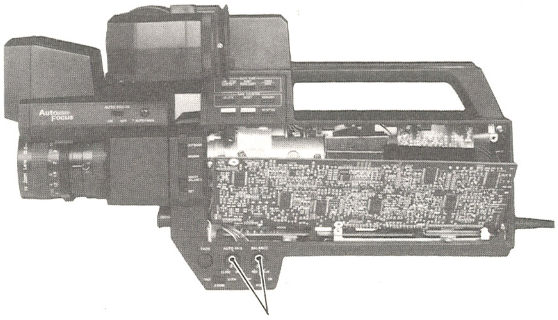

Remove
two knobs

Fig. 7

(8) Place the camera upside down.

(9) Remove three screws and remove the bottom cover.

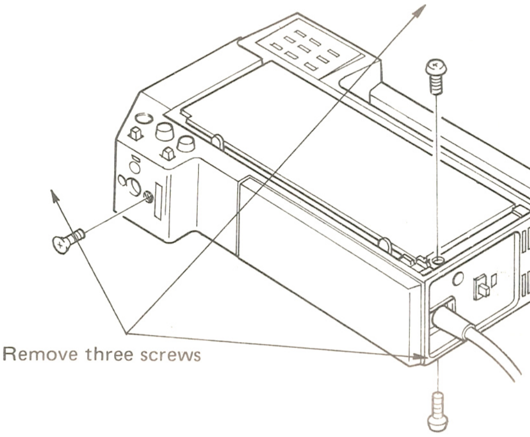

Remove three screws

Fig. 8

(10) The foil side of the micro processor board can be checked.

(11) When replacing the parts on the micro processor board, proceed following steps.

(a) Disconnect CN002 from the micro processor board.

(b) Unsolder the flat cable JA.

(c) The micro processor board can be opened as shown in Fig. 9 and Fig. 10.

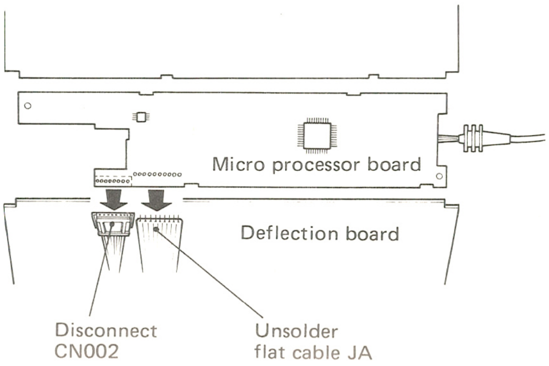

Micro processor board
Deflection board
Disconnect
CN002
Unsolder
flat cable JA

Fig. 9

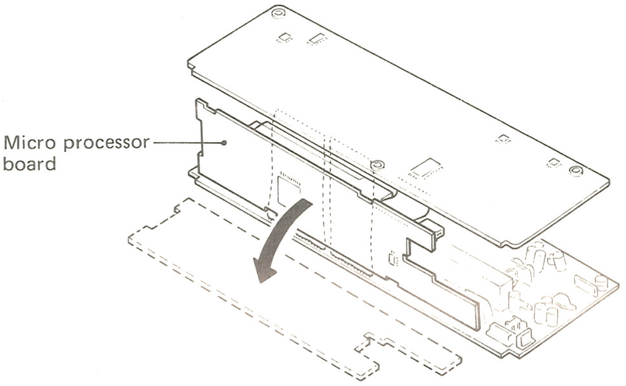
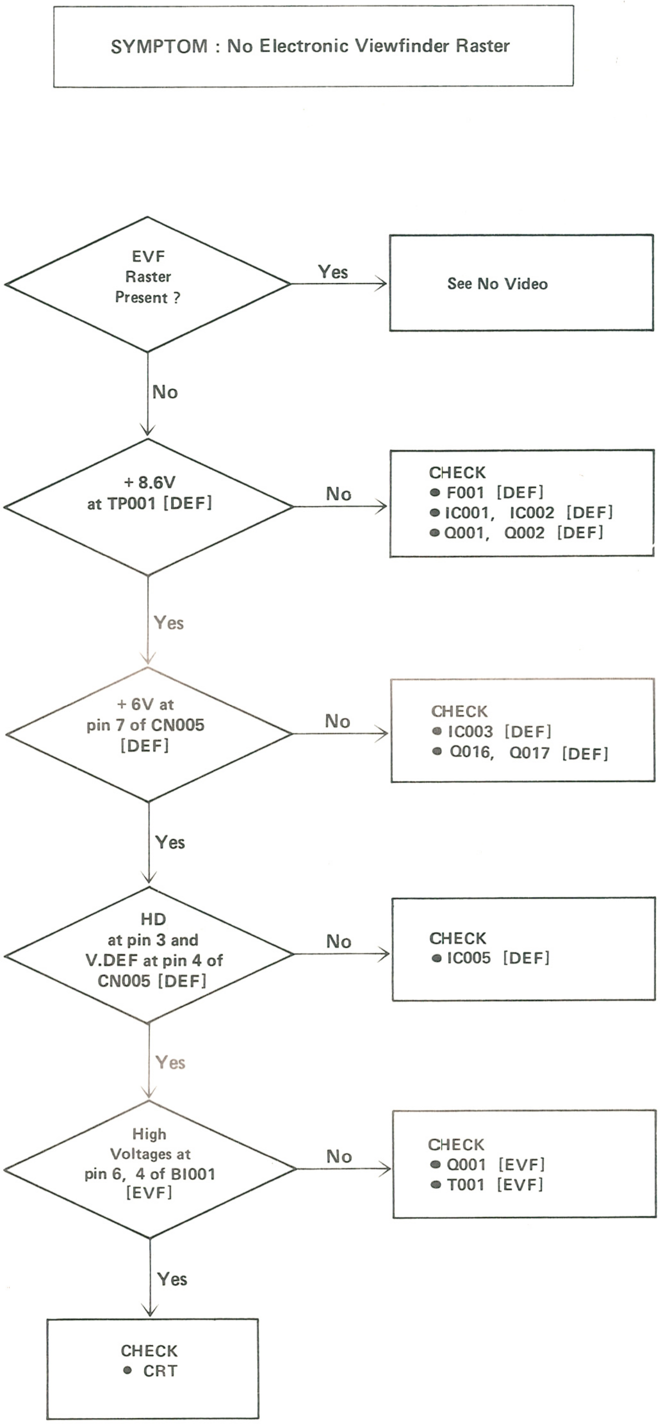

Micro processor board

Fig. 10

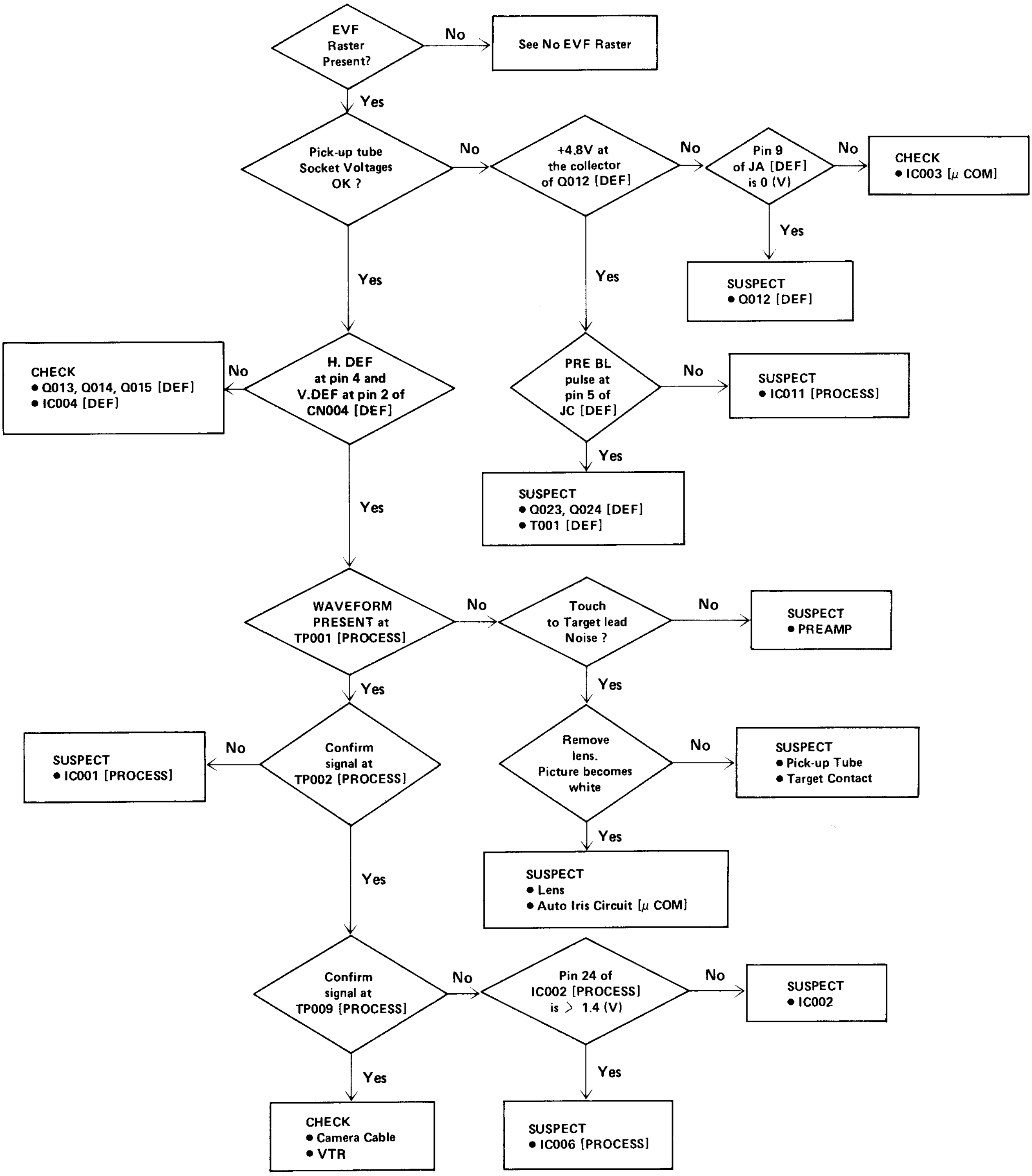
(12) After replacing the parts, proceed above steps in the reverse order.

TROUBLE SHOOTING GUIDE (1) WVP-100


SYMPTOM : No Electronic Viewfinder Raster
EVF Raster Present ?
Yes
See No Video
No
+ 8.6V at TP001 [DEF]
No
CHECK
● F001 [DEF]
● IC001, IC002 [DEF]
● Q001, Q002 [DEF]
Yes
+ 6V at pin 7 of CN005 [DEF]
No
CHECK
● IC003 [DEF]
● Q016, Q017 [DEF]
Yes
HD at pin 3 and V.DEF at pin 4 of CN005 [DEF]
No
CHECK
● IC005 [DEF]
Yes
High Voltages at pin 6, 4 of BI001 [EVF]
No
CHECK
● Q001 [EVF]
● T001 [EVF]
Yes
CHECK
● CRT

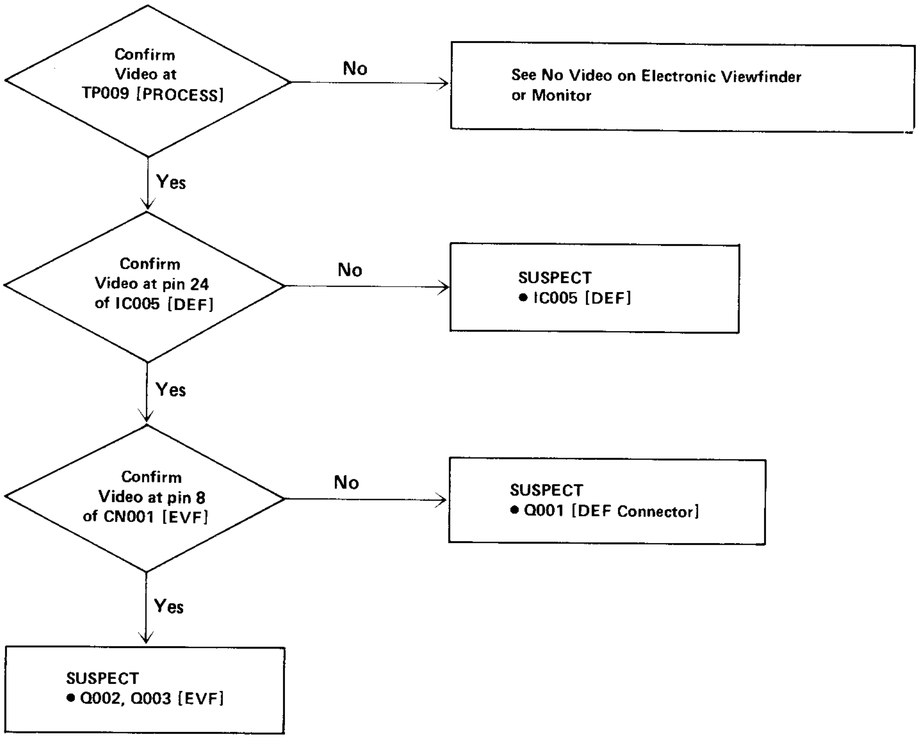
TROUBLE SHOOTING GUIDE (2) WVP-100

SYMPTOM : No Video (Luminance) on Electronic Viewfinder or Monitor

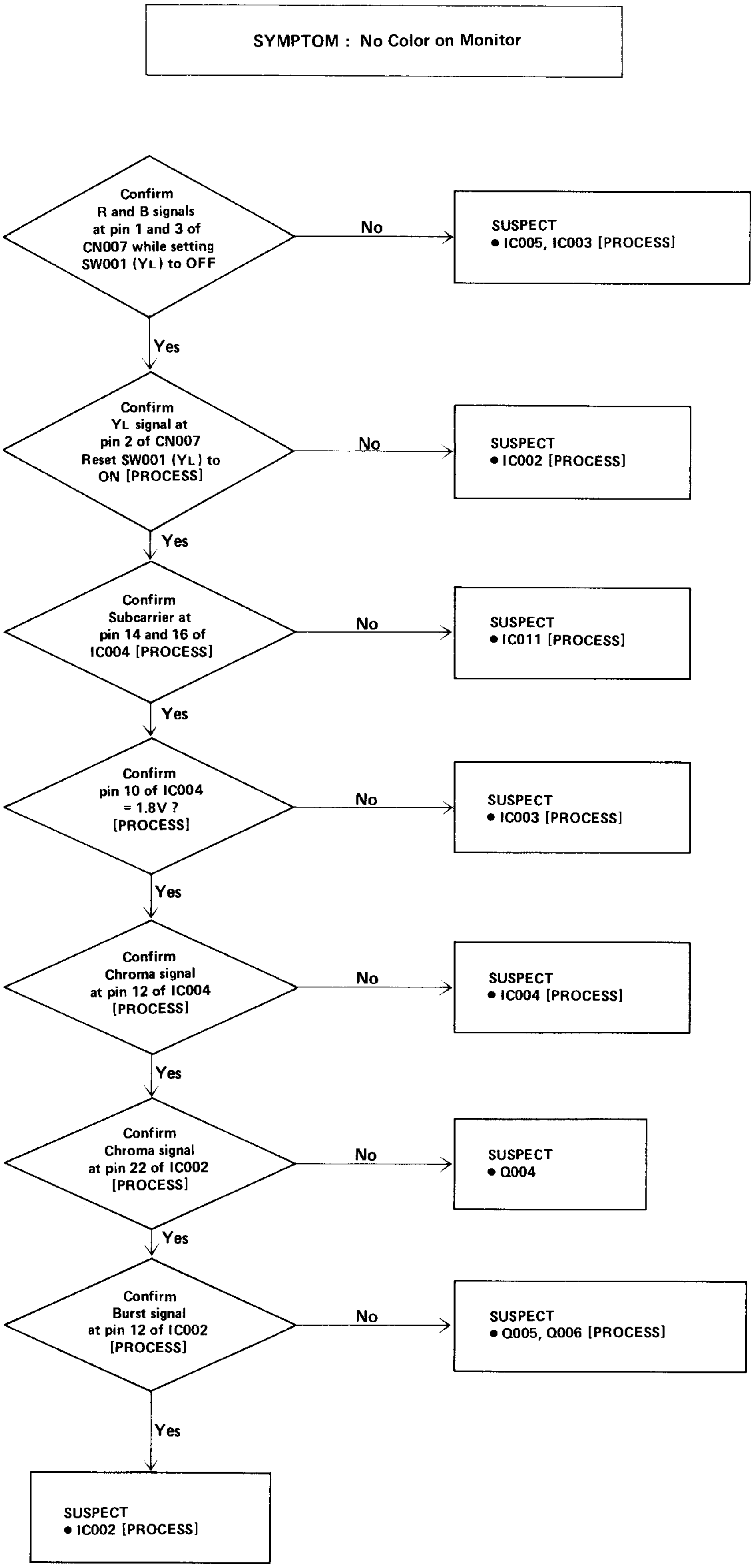

EVF Raster Present?
No
See No EVF Raster
Yes
Pick-up tube Socket Voltages OK ?
No
+4.8V at the collector of Q012 [DEF]
No
Pin 9 of JA [DEF] is 0 (V)
No
CHECK
• IC003 [μ COM]
Yes
SUSPECT
• Q012 [DEF]
Yes
Yes
CHECK
• Q013, Q014, Q015 [DEF]
• IC004 [DEF]
No
H. DEF at pin 4 and V.DEF at pin 2 of CN004 [DEF]
PRE BL pulse at pin 5 of JC [DEF]
No
SUSPECT
• IC011 [PROCESS]
Yes
SUSPECT
• Q023, Q024 [DEF]
• T001 [DEF]
Yes
WAVEFORM PRESENT at TP001 [PROCESS]
No
Touch to Target lead Noise ?
No
SUSPECT
• PREAMP
Yes
Yes
SUSPECT
• IC001 [PROCESS]
No
Confirm signal at TP002 [PROCESS]
Remove lens. Picture becomes white
No
SUSPECT
• Pick-up Tube
• Target Contact
Yes
SUSPECT
• Lens
• Auto Iris Circuit [μ COM]
Yes
Confirm signal at TP009 [PROCESS]
No
Pin 24 of IC002 [PROCESS] is > 1.4 (V)
No
SUSPECT
• IC002
Yes
Yes
CHECK
• Camera Cable
• VTR
SUSPECT
• IC006 [PROCESS]

TROUBLE SHOOTING GUIDE (3) WVP-100

SYMPTOM : No Video on Electronic Viewfinder Only

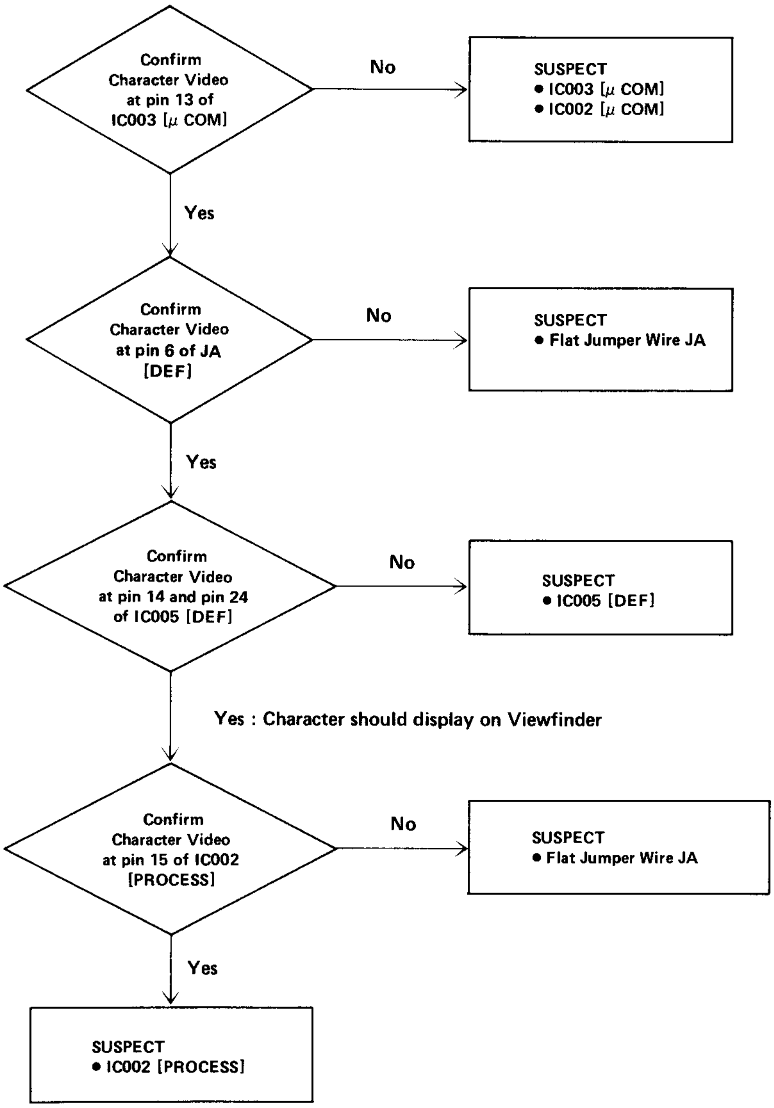

Confirm
Video at
TP009 [PROCESS]
No
See No Video on Electronic Viewfinder
or Monitor
Yes
Confirm
Video at pin 24
of IC005 [DEF]
No
SUSPECT
● IC005 [DEF]
Yes
Confirm
Video at pin 8
of CN001 [EVF]
No
SUSPECT
● Q001 [DEF Connector]
Yes
SUSPECT
● Q002, Q003 [EVF]

TROUBLE SHOOTING GUIDE (4) WVP-100


SYMPTOM : No Color on Monitor
Confirm R and B signals at pin 1 and 3 of CN007 while setting SW001 (YL) to OFF
No
SUSPECT
• IC005, IC003 [PROCESS]
Yes
Confirm YL signal at pin 2 of CN007 Reset SW001 (YL) to ON [PROCESS]
No
SUSPECT
• IC002 [PROCESS]
Yes
Confirm Subcarrier at pin 14 and 16 of IC004 [PROCESS]
No
SUSPECT
• IC011 [PROCESS]
Yes
Confirm pin 10 of IC004 = 1.8V ? [PROCESS]
No
SUSPECT
• IC003 [PROCESS]
Yes
Confirm Chroma signal at pin 12 of IC004 [PROCESS]
No
SUSPECT
• IC004 [PROCESS]
Yes
Confirm Chroma signal at pin 22 of IC002 [PROCESS]
No
SUSPECT
• Q004
Yes
Confirm Burst signal at pin 12 of IC002 [PROCESS]
No
SUSPECT
• Q005, Q006 [PROCESS]
Yes
SUSPECT
• IC002 [PROCESS]

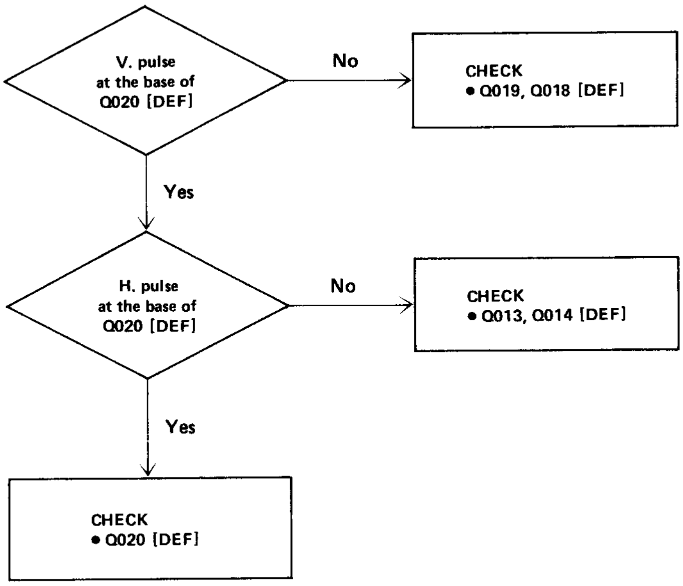
TROUBLE SHOOTING GUIDE (5) WVP-100

SYMPTOM : No Character Display on Viewfinder or Monitor

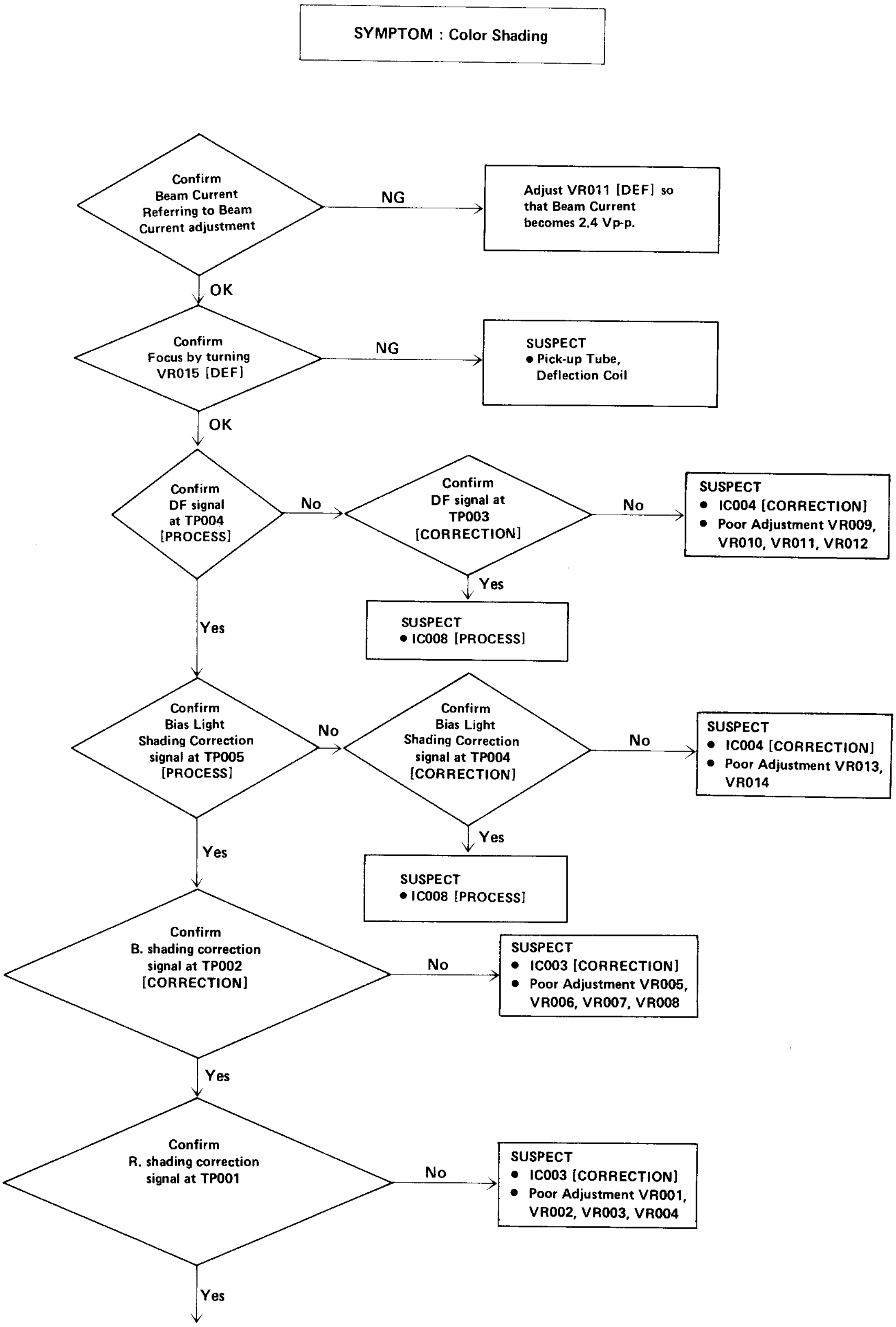

Confirm Character Video at pin 13 of IC003 [μ COM]
No
SUSPECT
• IC003 [μ COM]
• IC002 [μ COM]
Yes
Confirm Character Video at pin 6 of JA [DEF]
No
SUSPECT
• Flat Jumper Wire JA
Yes
Confirm Character Video at pin 14 and pin 24 of IC005 [DEF]
No
SUSPECT
• IC005 [DEF]
Yes : Character should display on Viewfinder
Confirm Character Video at pin 15 of IC002 [PROCESS]
No
SUSPECT
• Flat Jumper Wire JA
Yes
SUSPECT
• IC002 [PROCESS]

TROUBLE SHOOTING GUIDE (6) WVP-100

SYMPTOM : Retrace Line in Electronic Viewfinder and Monitor

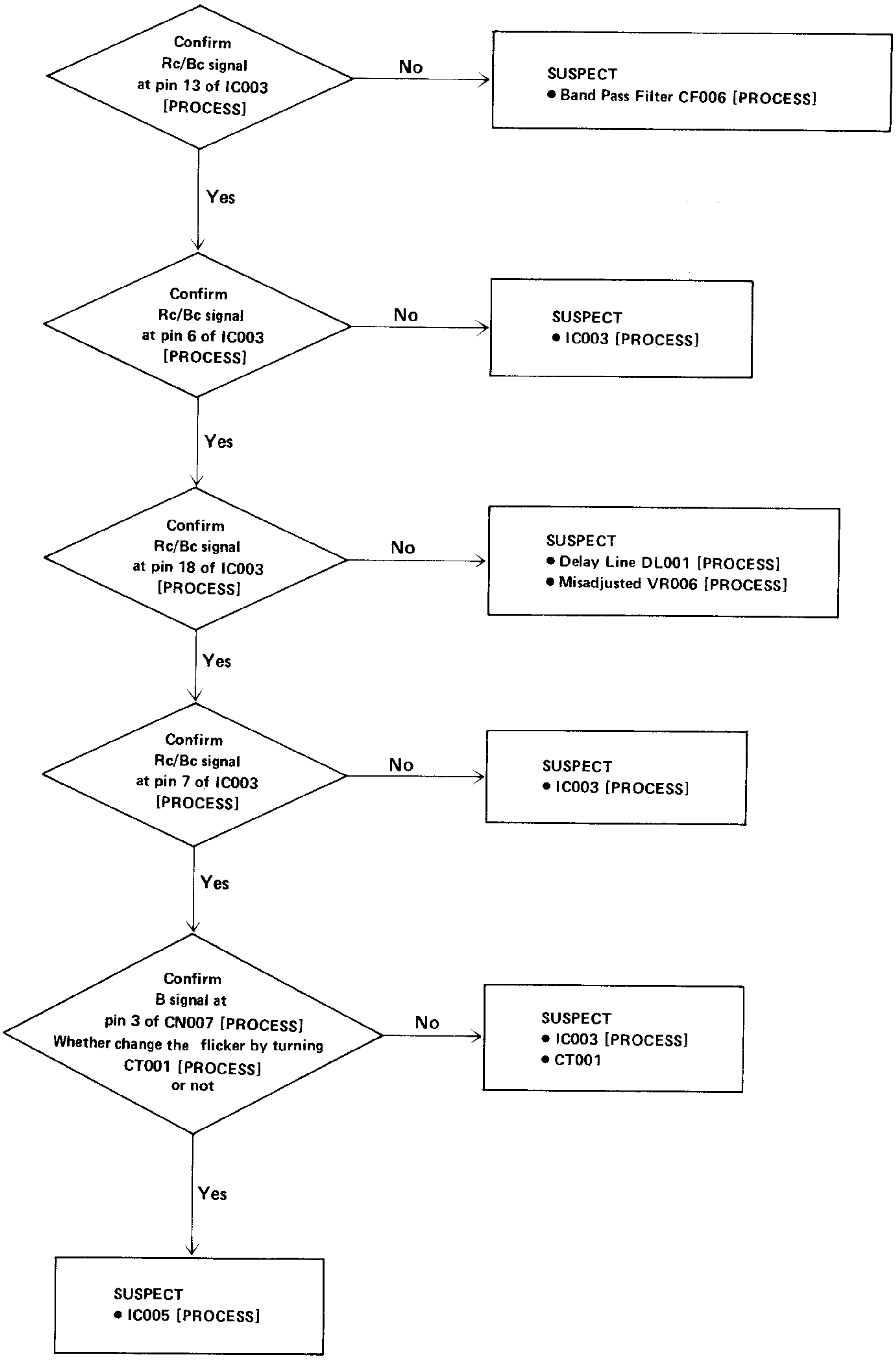

V. pulse
at the base of
Q020 [DEF]
No
CHECK
• Q019, Q018 [DEF]
Yes
H. pulse
at the base of
Q020 [DEF]
No
CHECK
• Q013, Q014 [DEF]
Yes
CHECK
• Q020 [DEF]

TROUBLE SHOOTING GUIDE (7) WVP-100


SYMPTOM : Color Shading
Confirm Beam Current Referring to Beam Current adjustment
NG
Adjust VR011 [DEF] so that Beam Current becomes 2.4 Vp-p.
OK
Confirm Focus by turning VR015 [DEF]
NG
SUSPECT
● Pick-up Tube, Deflection Coil
OK
Confirm DF signal at TP004 [PROCESS]
No
Confirm DF signal at TP003 [CORRECTION]
No
SUSPECT
● IC004 [CORRECTION]
● Poor Adjustment VR009, VR010, VR011, VR012
Yes
SUSPECT
● IC008 [PROCESS]
Yes
Confirm Bias Light Shading Correction signal at TP005 [PROCESS]
No
Confirm Bias Light Shading Correction signal at TP004 [CORRECTION]
No
SUSPECT
● IC004 [CORRECTION]
● Poor Adjustment VR013, VR014
Yes
SUSPECT
● IC008 [PROCESS]
Yes
Confirm B. shading correction signal at TP002 [CORRECTION]
No
SUSPECT
● IC003 [CORRECTION]
● Poor Adjustment VR005, VR006, VR007, VR008
Yes
Confirm R. shading correction signal at TP001
No
SUSPECT
● IC003 [CORRECTION]
● Poor Adjustment VR001, VR002, VR003, VR004
Yes

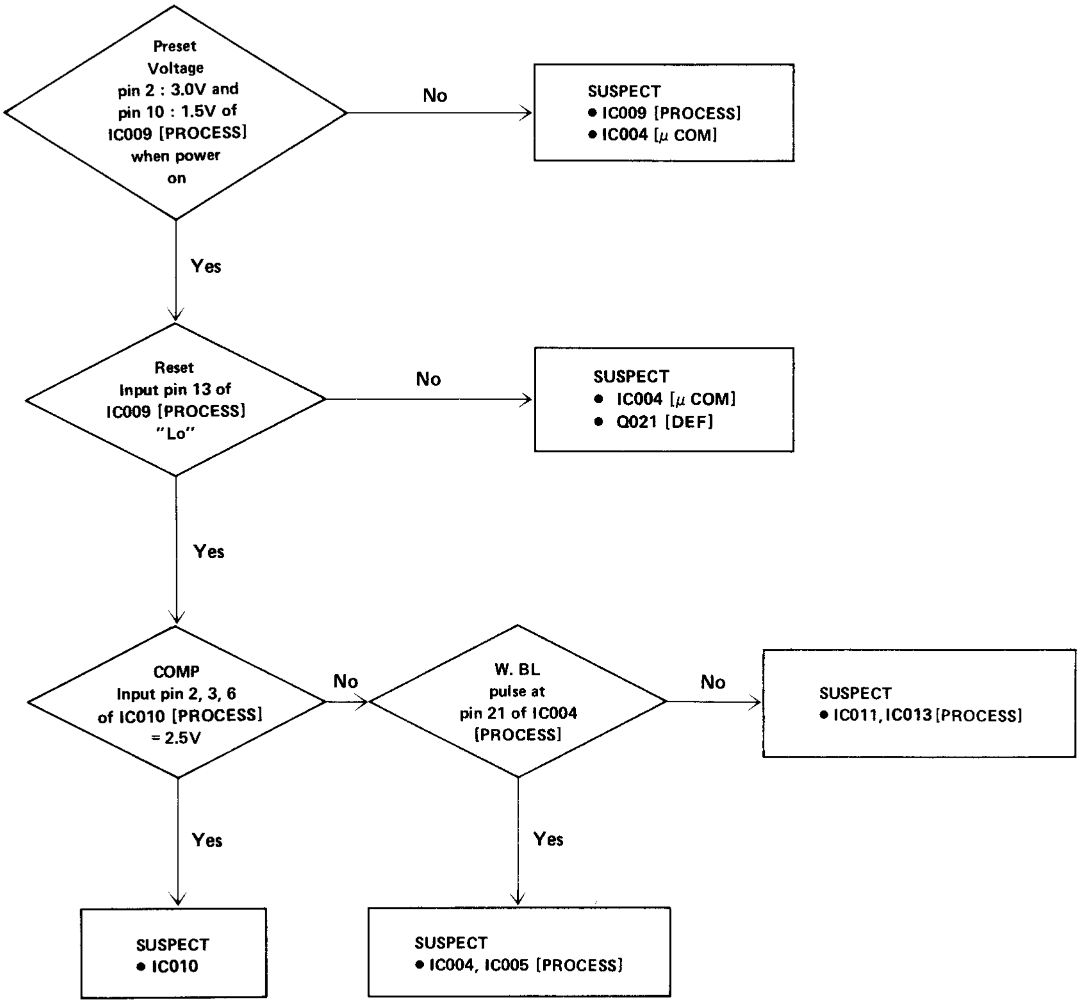
TROUBLE SHOOTING GUIDE (8) WVP-100

SYMPTOM : Incorrect Color
No Red or Blue Separation


Confirm
Rc/Bc signal
at pin 13 of IC003
[PROCESS]
No
SUSPECT
● Band Pass Filter CF006 [PROCESS]
Yes
Confirm
Rc/Bc signal
at pin 6 of IC003
[PROCESS]
No
SUSPECT
● IC003 [PROCESS]
Yes
Confirm
Rc/Bc signal
at pin 18 of IC003
[PROCESS]
No
SUSPECT
● Delay Line DL001 [PROCESS]
● Misadjusted VR006 [PROCESS]
Yes
Confirm
Rc/Bc signal
at pin 7 of IC003
[PROCESS]
No
SUSPECT
● IC003 [PROCESS]
Yes
Confirm
B signal at
pin 3 of CN007 [PROCESS]
Whether change the flicker by turning
CT001 [PROCESS]
or not
No
SUSPECT
● IC003 [PROCESS]
● CT001
Yes
SUSPECT
● IC005 [PROCESS]

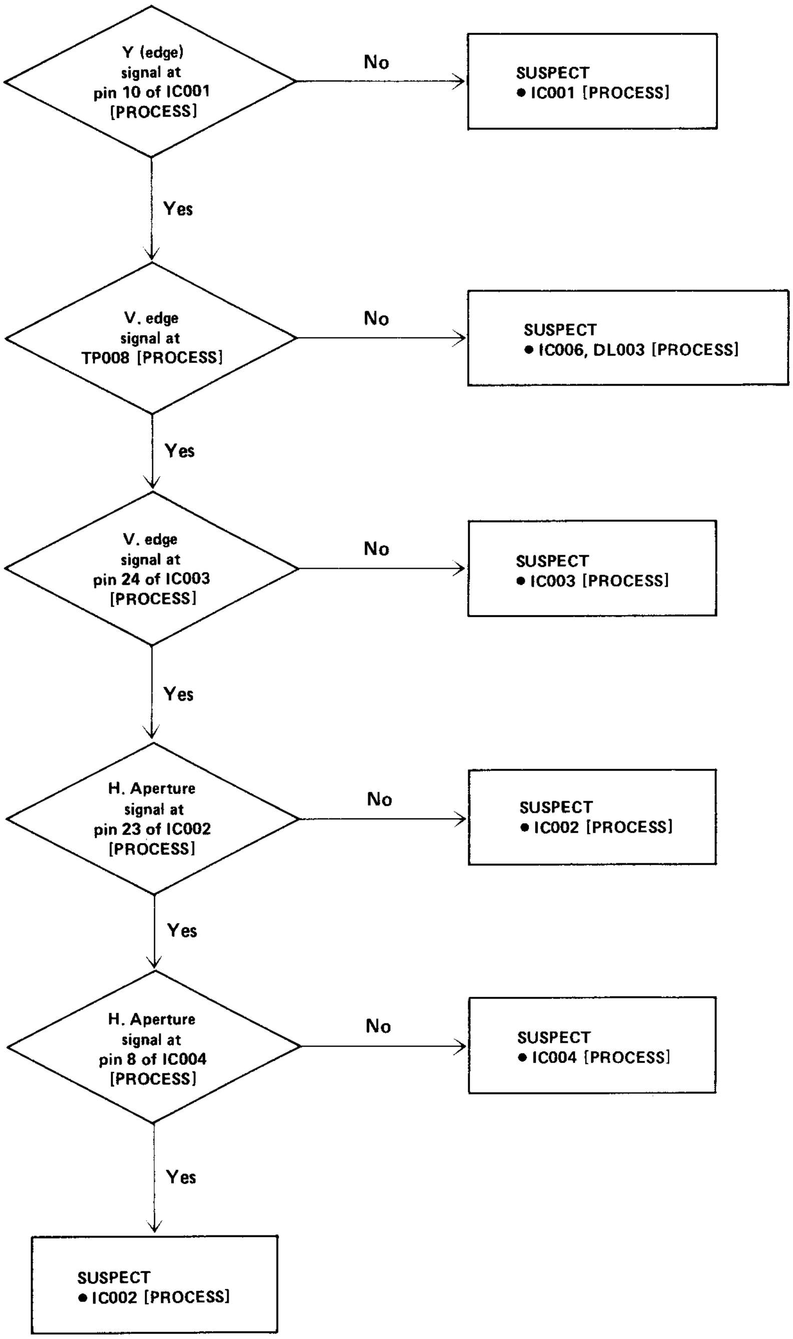
TROUBLE SHOOTING GUIDE (9) WVP-100

SYMPTOM : Incorrect White Set Operation
Red, Blue, or Green Tinted Picture


Preset Voltage pin 2 : 3.0V and pin 10 : 1.5V of IC009 [PROCESS] when power on
No
SUSPECT
• IC009 [PROCESS]
• IC004 [μ COM]
Yes
Reset Input pin 13 of IC009 [PROCESS] "Lo"
No
SUSPECT
• IC004 [μ COM]
• Q021 [DEF]
Yes
COMP Input pin 2, 3, 6 of IC010 [PROCESS] = 2.5V
No
W. BL pulse at pin 21 of IC004 [PROCESS]
No
SUSPECT
• IC011, IC013 [PROCESS]
Yes
SUSPECT
• IC010
Yes
SUSPECT
• IC004, IC005 [PROCESS]

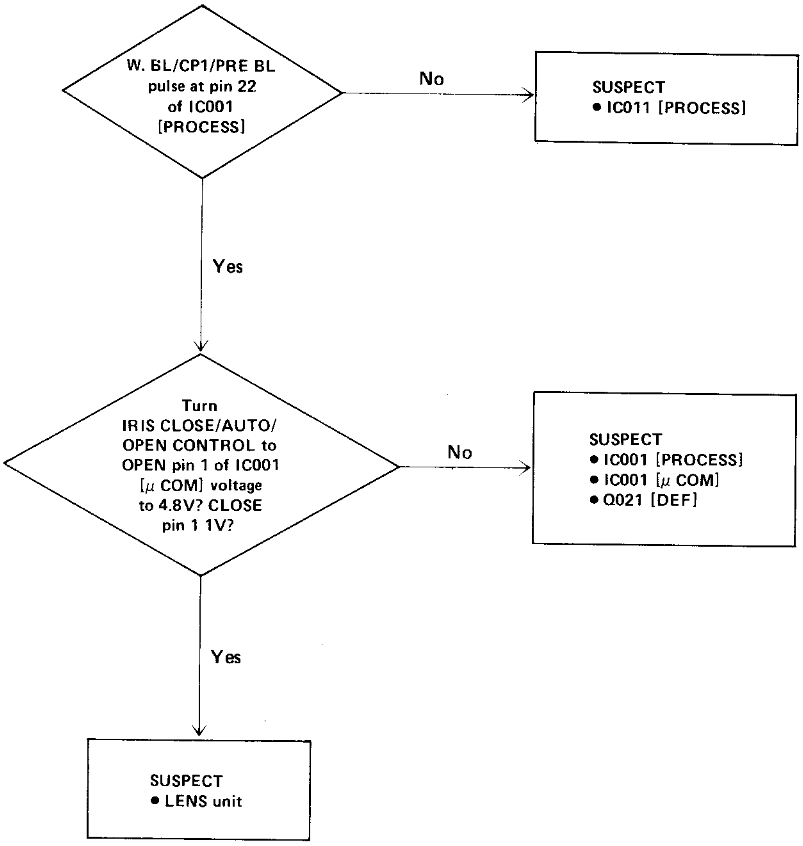
TROUBLE SHOOTING GUIDE (10) WVP-100

SYMPTOM: Soft Picture
No Vertical or Horizontal Detail


Y (edge) signal at pin 10 of IC001 [PROCESS]
No
SUSPECT
• IC001 [PROCESS]
Yes
V. edge signal at TP008 [PROCESS]
No
SUSPECT
• IC006, DL003 [PROCESS]
Yes
V. edge signal at pin 24 of IC003 [PROCESS]
No
SUSPECT
• IC003 [PROCESS]
Yes
H. Aperture signal at pin 23 of IC002 [PROCESS]
No
SUSPECT
• IC002 [PROCESS]
Yes
H. Aperture signal at pin 8 of IC004 [PROCESS]
No
SUSPECT
• IC004 [PROCESS]
Yes
SUSPECT
• IC002 [PROCESS]

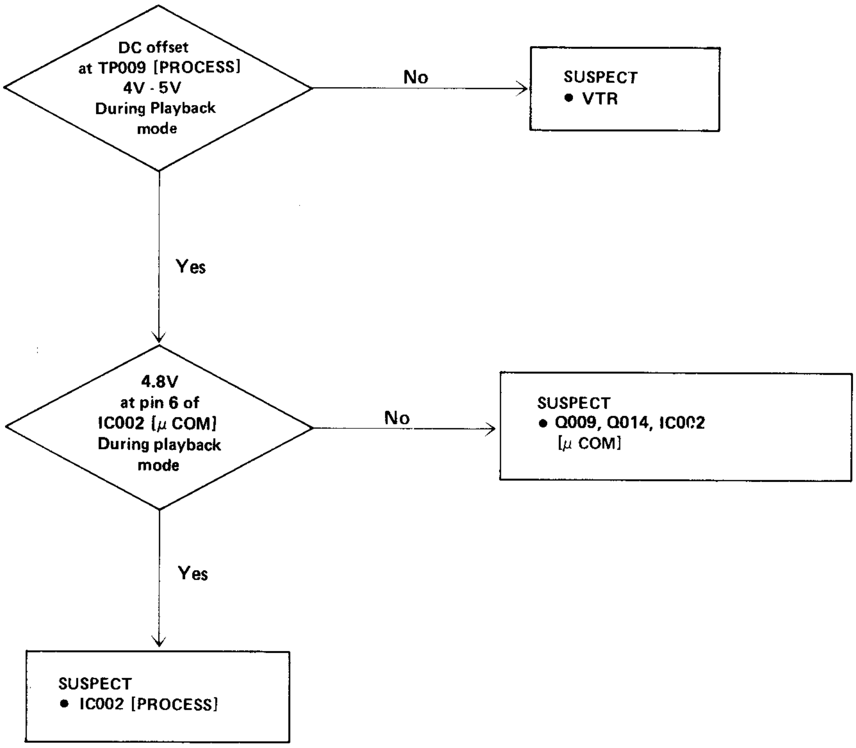
TROUBLE SHOOTING GUIDE (11) WVP-100

SYMPTOM : Video Level Too High/Low
White Picture Areas Blooming
No/Incorrect Iris Operation


W. BL/CP1/PRE BL pulse at pin 22 of IC001 [PROCESS]
No
SUSPECT
• IC011 [PROCESS]
Yes
Turn IRIS CLOSE/AUTO/ OPEN CONTROL to OPEN pin 1 of IC001 [μ COM] voltage to 4.8V? CLOSE pin 1 1V?
No
SUSPECT
• IC001 [PROCESS]
• IC001 [μ COM]
• Q021 [DEF]
Yes
SUSPECT
• LENS unit

TROUBLE SHOOTING GUIDE (12) WVP-100

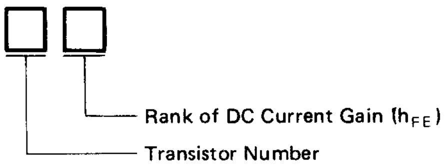
SYMPTOM : Two Separate Images on Electronic Viewfinder Screen During Playback Mode


DC offset at TP009 [PROCESS] 4V - 5V During Playback mode
No
SUSPECT • VTR
Yes
4.8V at pin 6 of IC002 [μ COM] During playback mode
No
SUSPECT • Q009, Q014, IC002 [μ COM]
Yes
SUSPECT • IC002 [PROCESS]

CHIP COMPONENTS

1. Chip Transistor

The transistor number is indicated on the top surface of the chip transistor using two alphabet letters.



Transistor Number

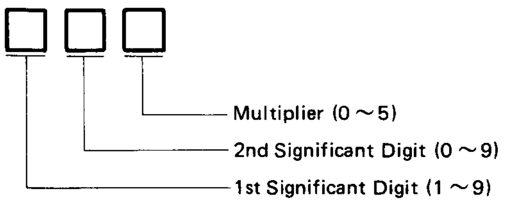
Letter	Transistor No.	Letter	Transistor No.
A	2SB709	V	2SC2295
B	2SB709A	W	2SD602
C	2SB710	X	2SD602A
D	2SB710A	Y	2SD601
E	2SA1022	Z	2SD601A
F	2SA1034	1Z	2SD1030
H	2SA1035	1N	2SK199
I	2SB792	1O	2SK198
K	2SC2778	1A	2SB799
P	2SD814	1B	2SB814
Q	2SD813	1C	2SB902
R	2SC2480	1F	2SK321
S	2SC2405	1M	2SJ84
T	2SC2406	1T	2SC3077
U	2SC2404	1X	2SC2845

EXAMPLE:

WQ ⟶ 2SD602 – Q
YQ ⟶ 2SD601 – Q
1BS ⟶ 2SB814 – S

2. Chip Resistor

The resistor value is indicated on the bottom surface of the chip resistor using three digit numbers.



EXAMPLE:

330 ⟶ $33 \times 10^0 = 33$ ohms
561 ⟶ $56 \times 10^1 = 560$ ohms
123 ⟶ $12 \times 10^3 = 12$ kohms

Note: Zero ohm resistor (jumper chip) is colored red or green.

3. Chip Capacitor

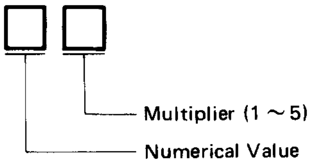
The capacitive value of ***replacement*** chip capacitors is indicated on the bottom surface. Original parts do not have value indication.

If the capacitive value is less than 100 pF, the value will be indicated by one or two digit number expressing the capacity directly in pF.

EXAMPLE:

0.5 ⟶ 0.5 pF   2.5 ⟶ 2.5 pF
.75 ⟶ 0.75 pF   33 ⟶ 33 pF
1 ⟶ 1 pF   82 ⟶ 82 pF

If the capacitive value is 100 pF or greater, the value will be indicated by an alpha-numeric code. The letter precedes the number and expresses a numerical value to be multiplied by the number which follows.



Numerical Value

Letter	Value	Letter	Value
A	10	N	33
B	11	P	36
C	12	Q	39
D	13	R	43
E	15	S	47
F	16	T	51
G	18	U	56
H	20	V	62
J	22	W	68
K	24	X	75
L	27	Y	82
M	30	Z	91

* Letters I and O are not used.

EXAMPLE:

A1 ⟶ $10 \times 10^1 = 100$ pF
N2 ⟶ $33 \times 10^2 = 3300$ pF
S3 ⟶ $47 \times 10^3 = 47000$ pF

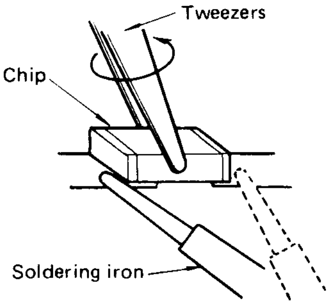
CHIP COMPONENTS

A. Precautions in replacing the chip component

1. Make sure that the unit is turned OFF when replacing the chip.
2. Use tweezers to prevent any damage to the chip surface.
3. Do not re-use the chips after removal.
4. Do not rub the electrode of chips.
5. Do not subject the chips to excessive stress.
6. It is recommended that a pencil-type soldering iron to be used.
7. The solder whose diameter is less than 0.5 mm is recommended.
8. Do not heat the chip beyond 3 seconds.
9. Maintain temperature control under 260°C (500°F) when soldering.

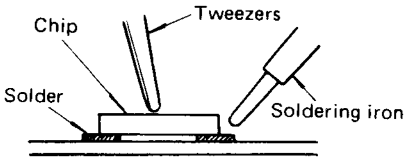
B. Removal

1. Add the solder to both ends of the chip (three leads for chip transistor).
2. While attaching the soldering iron to both ends of the chip (three leads for chip transistor) as shown below, remove the chip by turning it with tweezers.
   Note: Be careful not to damage other chips.

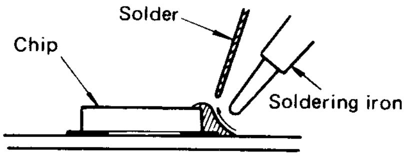


C. Mounting

1. Place the solder thinly on the chip mounting foil.
2. Solder the chip temporarily while holding the chip with the tweezers.



3. Solder both ends of chip (three leads for chip transistor).



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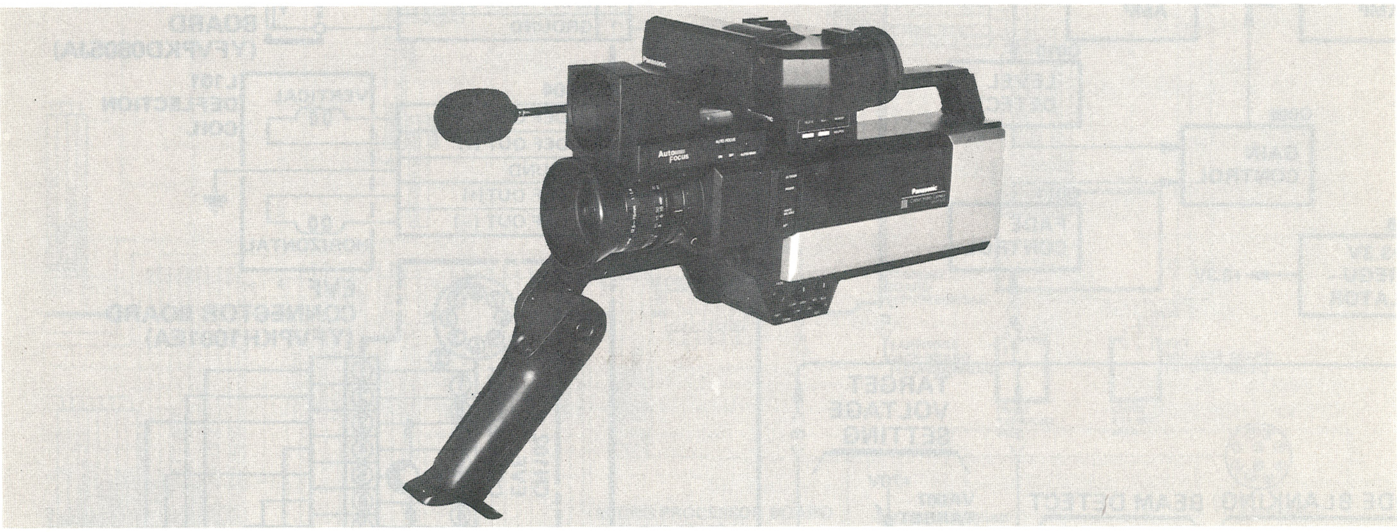
Service Manual

Vol. 3

Block Diagrams
Schematic Diagrams
Conductor Views

Colour Video Cameras

WVP-100E/WVP-100N



CONTENTS

WIRING DIAGRAM .... 1 ~ 2

BLOCK DIAGRAM

Deflection Board (YFVPKB1001EA) .... 3 ~ 5
Process Board (YFVPKC1001EA) .... 6 ~ 8
Micro Processor Board (YFVPKD1001EA) .... 9 ~ 11
Auto Focus Board (YFES950–24A, YFES950–24B, YFES950–24C, YFES950–24D) 12, 13
Electronic Viewfinder Board (YFVPKA0803JA) 14, 15

SCHEMATIC DIAGRAM

Deflection Board (YFVPKB1001EA) .... 16 ~ 19
Process Board (YFVPKC1001EA) .... 30 ~ 33
Micro Processor Board (YFVPKD1001EA) .... 34 ~ 37
Auto Focus Board (YFES950–24A, YFES950–24B, YFES950–24C, YFES950–24D) .... 41 ~ 43
Electronic Viewfinder Board (YFVPKA0803JA) 46, 47
Correction Board (YFVPKA0808JA) 50, 51
Preamplifier Board (YFVPKA0802EA) 58
Camera Remote Control Board (WV-CR10) 56, 57

CONDUCTOR VIEW

Deflection Board (YFVPKB1001EA) .... 22 ~ 24
Process Board (YFVPKC1001EA) .... 25 ~ 27
Micro Processor Board (YFVPKD1001EA) .... 38 ~ 40
Auto Focus Board (YFES950–24A, YFES950–24B, YFES950–24C, YFES950–24D) 44, 45
Electronic Viewfinder Board (YFVPKA0803JA) 48, 49
Correction Board (YFVPKA0808JA) 52, 53
Preamplifier Board (YFVPKA0802EA) 59
Camera Remote Control Board (WV-CR10) 54, 55

National/Panasonic

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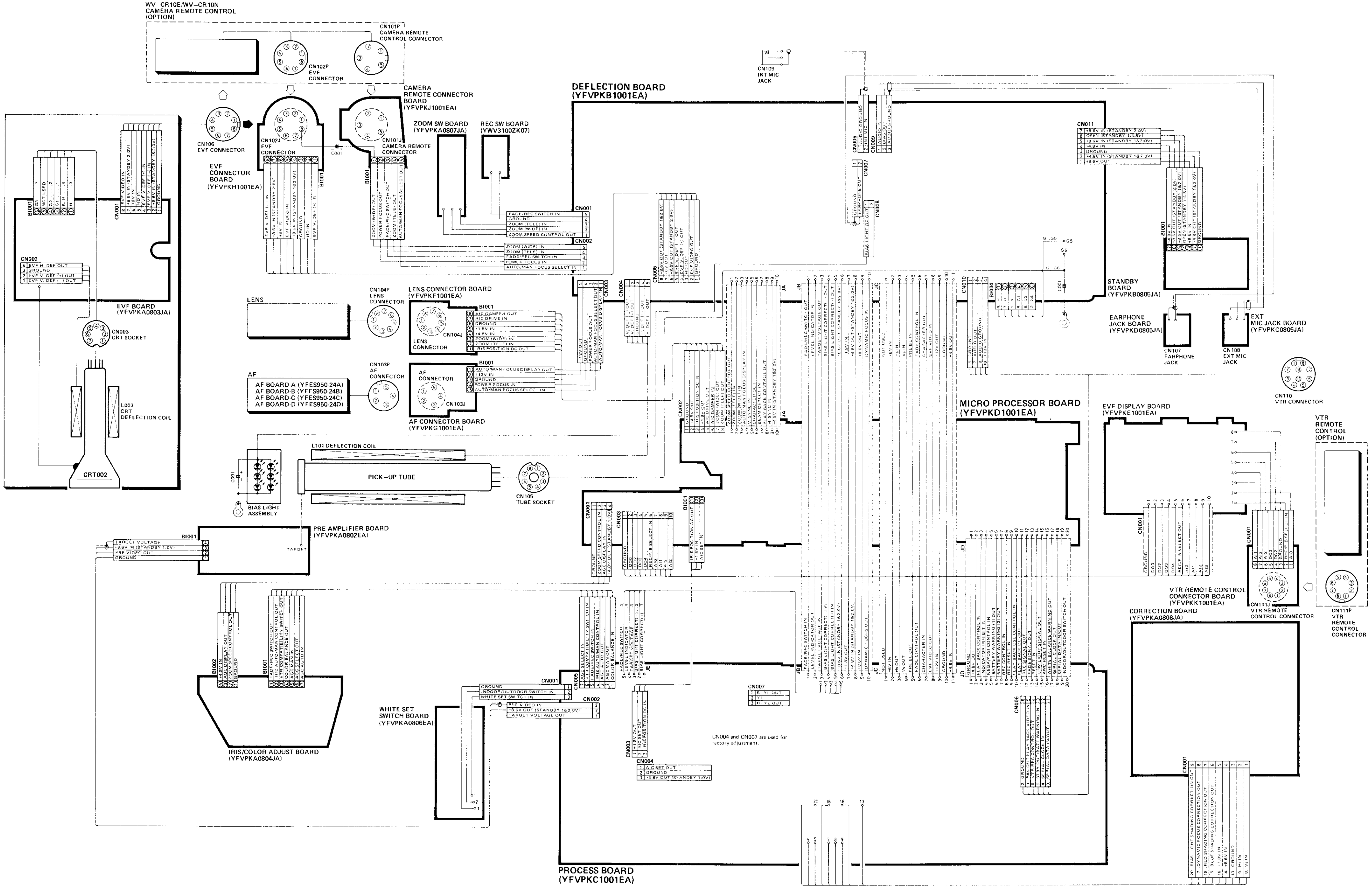
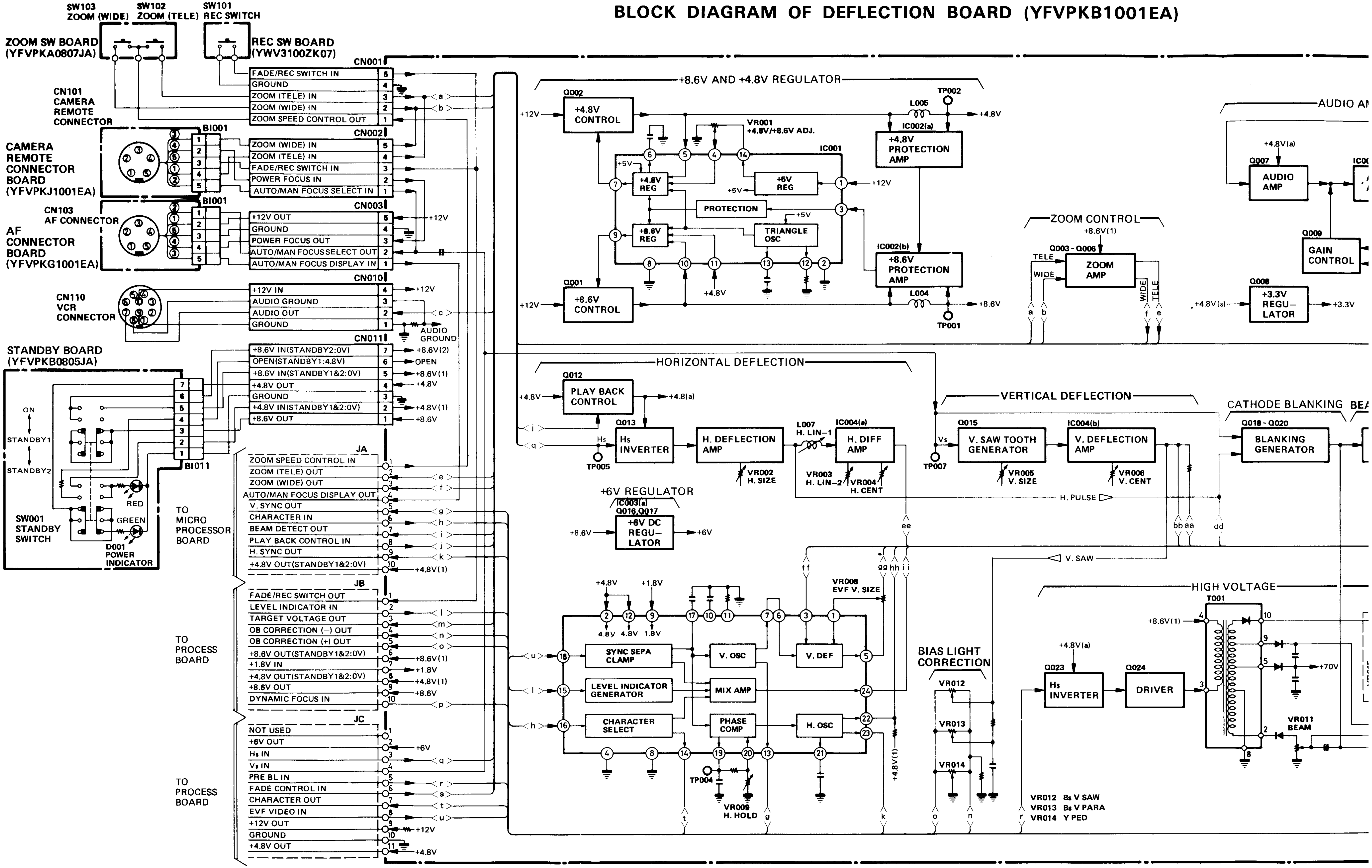
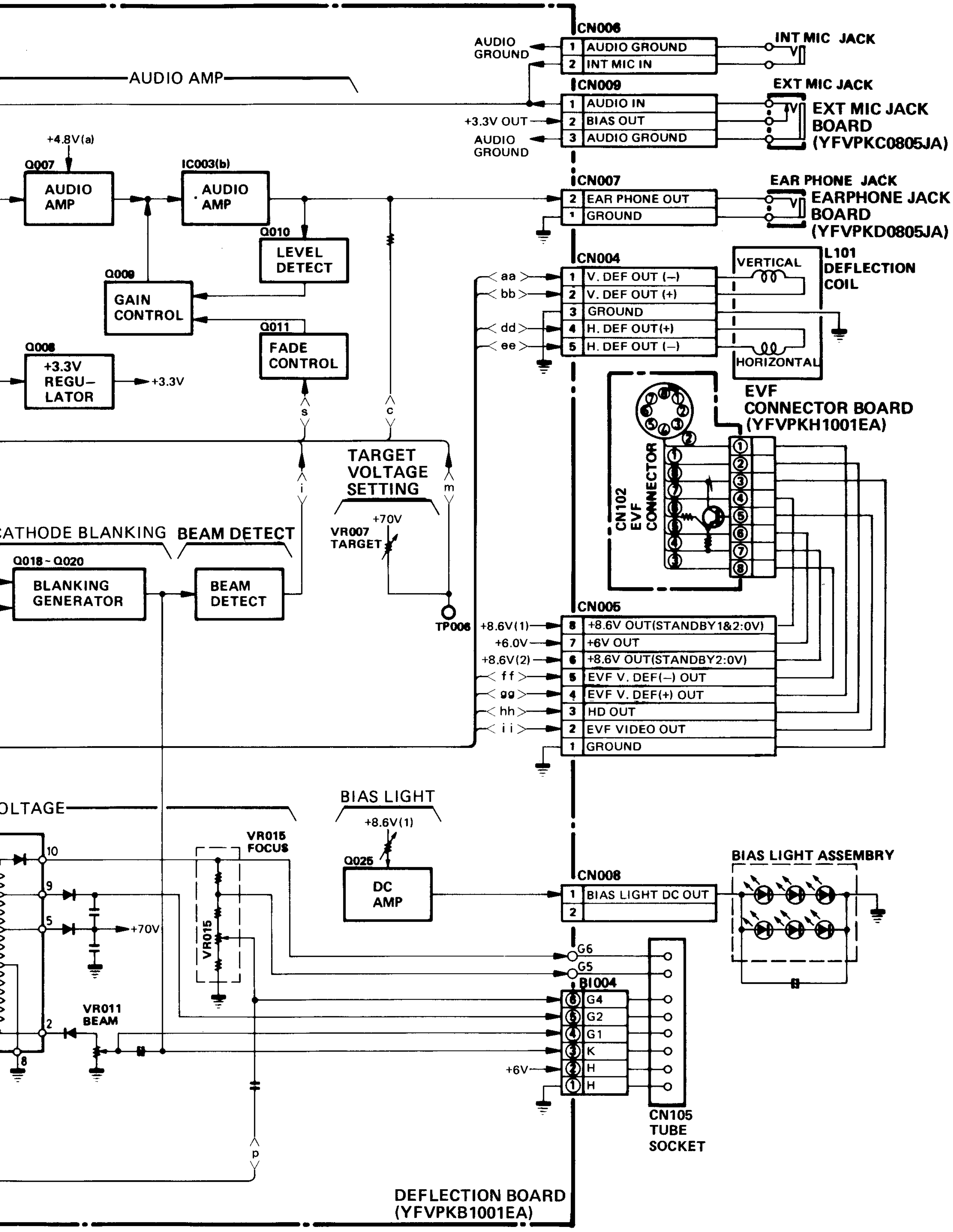
WIRING DIAGRAM

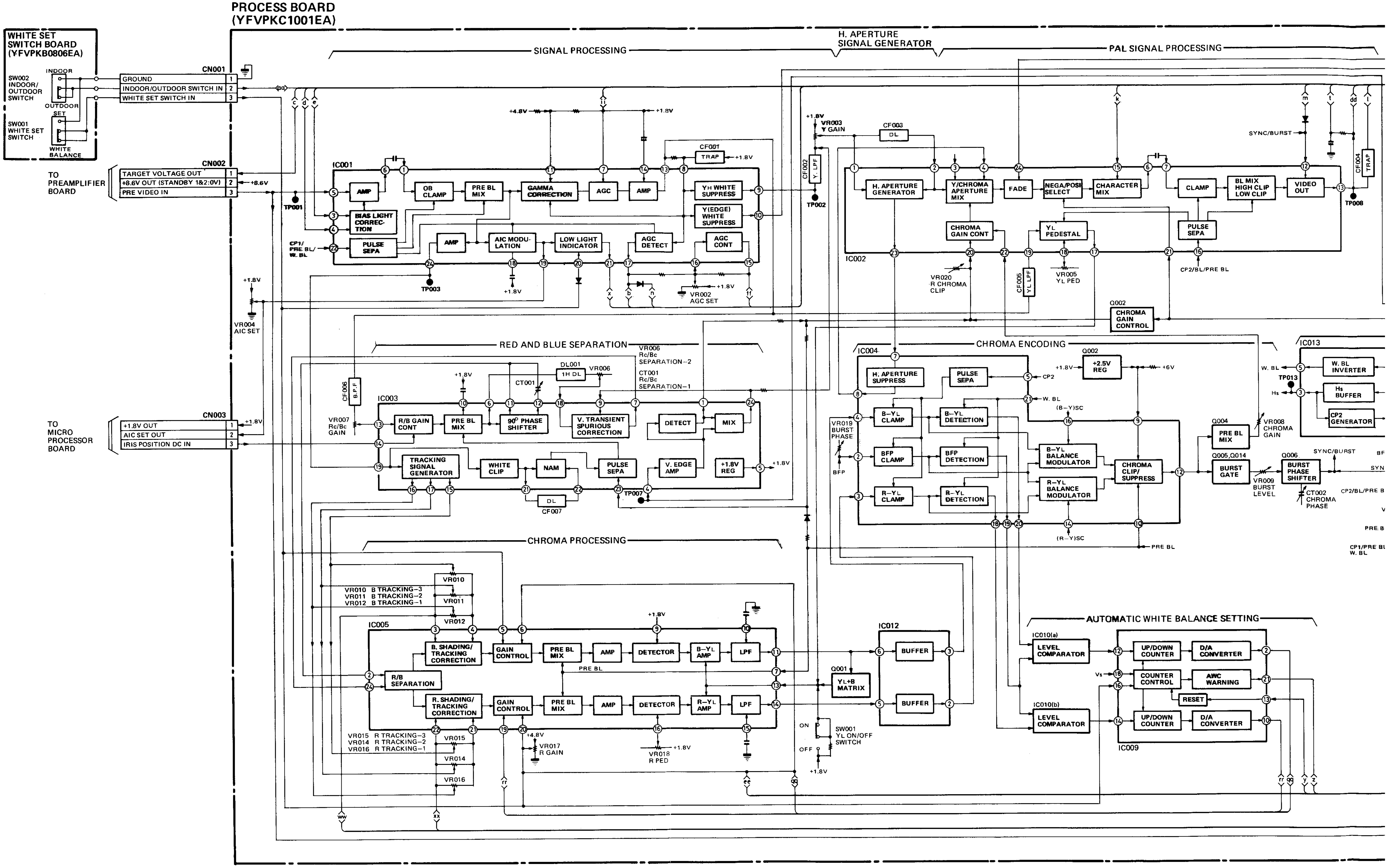

WV-CR10E/WV-CR10N
CAMERA REMOTE CONTROL
(OPTION)
CN101P CAMERA REMOTE CONTROL CONNECTOR
CN102P EVF CONNECTOR
CN106 EVF CONNECTOR
CN102J EVF CONNECTOR
EVF CONNECTOR BOARD (YFVPKH1001EA)
CAMERA REMOTE CONNECTOR BOARD (YFVPKJ1001EA)
CN101J CAMERA REMOTE CONNECTOR
ZOOM SW BOARD (YFVPKA0807JA)
REC SW BOARD (YWV3100ZK07)
DEFLECTION BOARD (YFVPKB1001EA)
CN109 INT MIC JACK
EVF BOARD (YFVPKA0803JA)
CN003 CRT SOCKET
L003 CRT DEFLECTION COIL
CRT002
LENS
CN104P LENS CONNECTOR
LENS CONNECTOR BOARD (YFVPKF1001EA)
CN104J
AF
AF BOARD A (YFES950-24A)
AF BOARD B (YFES950-24B)
AF BOARD C (YFES950-24C)
AF BOARD D (YFES950-24D)
CN103P AF CONNECTOR
AF CONNECTOR BOARD (YFVPKG1001EA)
CN103J
L101 DEFLECTION COIL
PICK-UP TUBE
CN105 TUBE SOCKET
BIAS LIGHT ASSEMBLY
PRE AMPLIFIER BOARD (YFVPKA0802EA)
TARGET
IRIS/COLOR ADJUST BOARD (YFVPKA0804JA)
WHITE SET SWITCH BOARD (YFVPKA0806EA)
PROCESS BOARD (YFVPKC1001EA)
CN004 and CN007 are used for factory adjustment.
MICRO PROCESSOR BOARD (YFVPKD1001EA)
STANDBY BOARD (YFVPKB0805JA)
EARPHONE JACK BOARD (YFVPKD0805JA)
CN107 EARPHONE JACK
EXT MIC JACK BOARD (YFVPKC0805JA)
CN108 EXT MIC JACK
CN110 VTR CONNECTOR
EVF DISPLAY BOARD (YFVPKE1001EA)
VTR REMOTE CONTROL (OPTION)
VTR REMOTE CONTROL CONNECTOR BOARD (YFVPKK1001EA)
CN111J VTR REMOTE CONTROL CONNECTOR
CN111P VTR REMOTE CONTROL CONNECTOR
CORRECTION BOARD (YFVPKA0808JA)

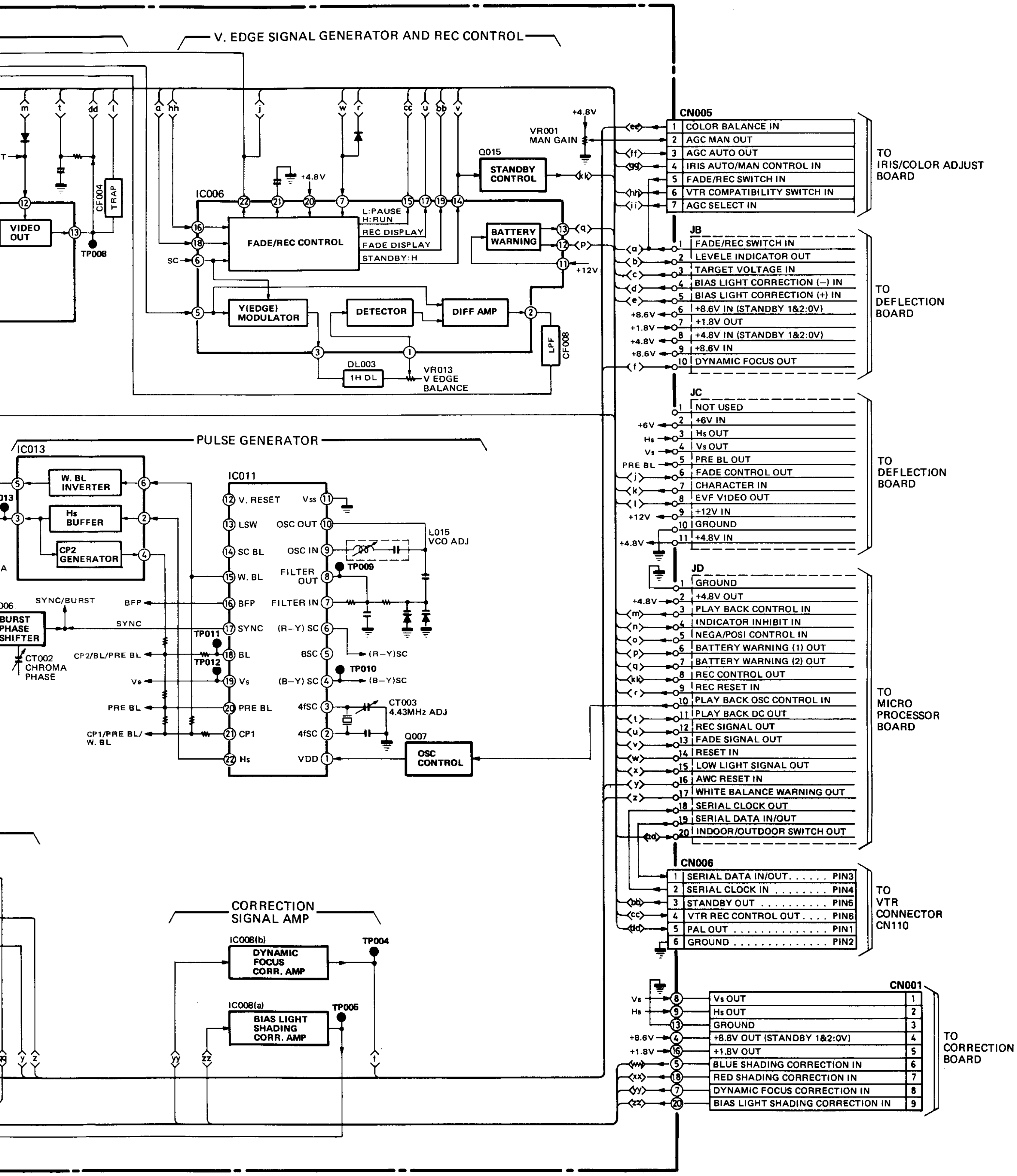
BLOCK DIAGRAM OF DEFLECTION BOARD (YFVPKB1001EA)


SW103 ZOOM (WIDE)
SW102 ZOOM (TELE)
SW101 REC SWITCH
ZOOM SW BOARD (YFVPKA0807JA)
REC SW BOARD (YWV3100ZK07)
CN001
FADE/REC SWITCH IN 5
GROUND 4
ZOOM (TELE) IN 3
ZOOM (WIDE) IN 2
ZOOM SPEED CONTROL OUT 1
CN101 CAMERA REMOTE CONNECTOR
CAMERA REMOTE CONNECTOR BOARD (YFVPKJ1001EA)
BI001
CN002
ZOOM (WIDE) IN 5
ZOOM (TELE) IN 4
FADE/REC SWITCH IN 3
POWER FOCUS IN 2
AUTO/MAN FOCUS SELECT IN 1
CN103 AF CONNECTOR
AF CONNECTOR BOARD (YFVPKG1001EA)
CN003
+12V OUT 5
GROUND 4
POWER FOCUS OUT 3
AUTO/MAN FOCUS SELECT OUT 2
AUTO/MAN FOCUS DISPLAY IN 1
CN110 VCR CONNECTOR
CN010
+12V IN 4
AUDIO GROUND 3
AUDIO OUT 2
GROUND 1
AUDIO GROUND
STANDBY BOARD (YFVPKB0805JA)
CN011
+8.6V IN(STANDBY2:0V) 7
OPEN(STANDBY1:4.8V) 6
+8.6V IN(STANDBY1&2:0V) 5
+4.8V OUT 4
GROUND 3
+4.8V IN(STANDBY1&2:0V) 2
+8.6V OUT 1
+8.6V(2)
OPEN
+8.6V(1)
+4.8V
+4.8V(1)
+8.6V
ON
STANDBY1
STANDBY2
BI011
SW001 STANDBY SWITCH
RED
GREEN
D001 POWER INDICATOR
TO MICRO PROCESSOR BOARD
JA
ZOOM SPEED CONTROL IN 1
ZOOM (TELE) OUT 2
ZOOM (WIDE) OUT 3
AUTO/MAN FOCUS DISPLAY OUT 4
V. SYNC OUT 5
CHARACTER IN 6
BEAM DETECT OUT 7
PLAY BACK CONTROL IN 8
H. SYNC OUT 9
+4.8V OUT(STANDBY1&2:0V) 10
TO PROCESS BOARD
JB
FADE/REC SWITCH OUT 1
LEVEL INDICATOR IN 2
TARGET VOLTAGE OUT 3
OB CORRECTION (–) OUT 4
OB CORRECTION (+) OUT 5
+8.6V OUT(STANDBY1&2:0V) 6
+1.8V IN 7
+4.8V OUT(STANDBY1&2:0V) 8
+8.6V OUT 9
DYNAMIC FOCUS IN 10
+1.8V
TO PROCESS BOARD
JC
NOT USED 1
+6V OUT 2
Hs IN 3
Vs IN 4
PRE BL IN 5
FADE CONTROL IN 6
CHARACTER OUT 7
EVF VIDEO IN 8
+12V OUT 9
GROUND 10
+4.8V OUT 11
+6V
+12V
+8.6V AND +4.8V REGULATOR
Q002
+4.8V CONTROL
Q001
+8.6V CONTROL
VR001 +4.8V/+8.6V ADJ.
IC001
+4.8V REG
+8.6V REG
+5V REG
PROTECTION
TRIANGLE OSC
+5V
L005
TP002
IC002(a)
+4.8V PROTECTION AMP
IC002(b)
+8.6V PROTECTION AMP
L004
TP001
AUDIO AM
+4.8V(a)
Q007
AUDIO AMP
IC00
Q009
GAIN CONTROL
Q008
+3.3V REGU-LATOR
+3.3V
ZOOM CONTROL
Q003~Q006
ZOOM AMP
TELE
WIDE
HORIZONTAL DEFLECTION
Q012
PLAY BACK CONTROL
+4.8(a)
Q013
Hs INVERTER
TP005
H. DEFLECTION AMP
VR002 H. SIZE
L007 H. LIN-1
IC004(a)
H. DIFF AMP
VR003 H. LIN-2
VR004 H. CENT
VERTICAL DEFLECTION
Q015
TP007
V. SAW TOOTH GENERATOR
VR005 V. SIZE
IC004(b)
V. DEFLECTION AMP
VR006 V. CENT
CATHODE BLANKING
BEA
Q018~Q020
BLANKING GENERATOR
H. PULSE
+6V REGULATOR
IC003(a) Q016,Q017
+6V DC REGU-LATOR
V. SAW
VR008 EVF V. SIZE
SYNC SEPA CLAMP
LEVEL INDICATOR GENERATOR
CHARACTER SELECT
V. OSC
MIX AMP
PHASE COMP
V. DEF
H. OSC
TP004
VR009 H. HOLD
BIAS LIGHT CORRECTION
VR012
VR013
VR014
VR012 Bs V SAW
VR013 Bs V PARA
VR014 Y PED
HIGH VOLTAGE
T001
Q023
Hs INVERTER
Q024
DRIVER
+70V
VR011 BEAM

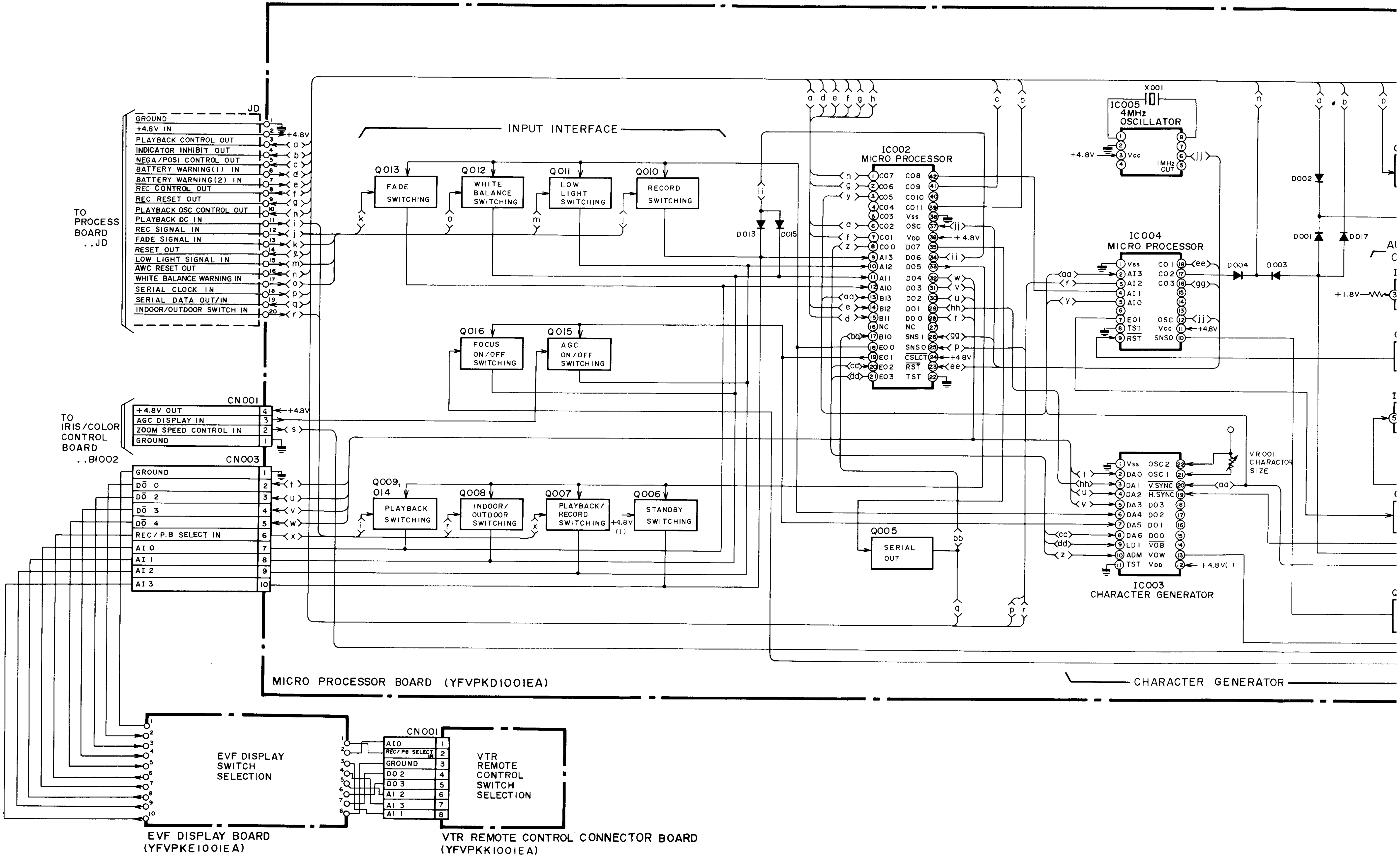

CN006
AUDIO GROUND
INT MIC IN
AUDIO GROUND
INT MIC JACK
AUDIO AMP
CN009
AUDIO IN
BIAS OUT
AUDIO GROUND
+3.3V OUT
AUDIO GROUND
EXT MIC JACK
EXT MIC JACK BOARD (YFVPKC0805JA)
+4.8V(a)
Q007
AUDIO AMP
IC003(b)
AUDIO AMP
CN007
EAR PHONE OUT
GROUND
EAR PHONE JACK
EARPHONE JACK BOARD (YFVPKD0805JA)
Q010
LEVEL DETECT
Q009
GAIN CONTROL
Q011
FADE CONTROL
Q008
+3.3V REGU-LATOR
+3.3V
CN004
aa
bb
dd
ee
V. DEF OUT (−)
V. DEF OUT (+)
GROUND
H. DEF OUT(+)
H. DEF OUT (−)
VERTICAL
HORIZONTAL
L101 DEFLECTION COIL
EVF CONNECTOR BOARD (YFVPKH1001EA)
CN102 EVF CONNECTOR
s
c
i
m
TARGET VOLTAGE SETTING
+70V
VR007 TARGET
CATHODE BLANKING
BEAM DETECT
Q018 ~ Q020
BLANKING GENERATOR
BEAM DETECT
TP006
CN005
+8.6V(1)
+6.0V
+8.6V(2)
ff
gg
hh
ii
+8.6V OUT(STANDBY1&2:0V)
+6V OUT
+8.6V OUT(STANDBY2:0V)
EVF V. DEF(−) OUT
EVF V. DEF(+) OUT
HD OUT
EVF VIDEO OUT
GROUND
OLTAGE
BIAS LIGHT
+8.6V(1)
Q025
DC AMP
VR015 FOCUS
VR015
CN008
BIAS LIGHT DC OUT
BIAS LIGHT ASSEMBRY
10
9
5
+70V
2
8
VR011 BEAM
G6
G5
BI004
G4
G2
G1
K
H
H
+6V
CN105 TUBE SOCKET
p
DEFLECTION BOARD (YFVPKB1001EA)

BLOCK DIAGRAM OF PROCESS BOARD (YFVPKC1001EA)

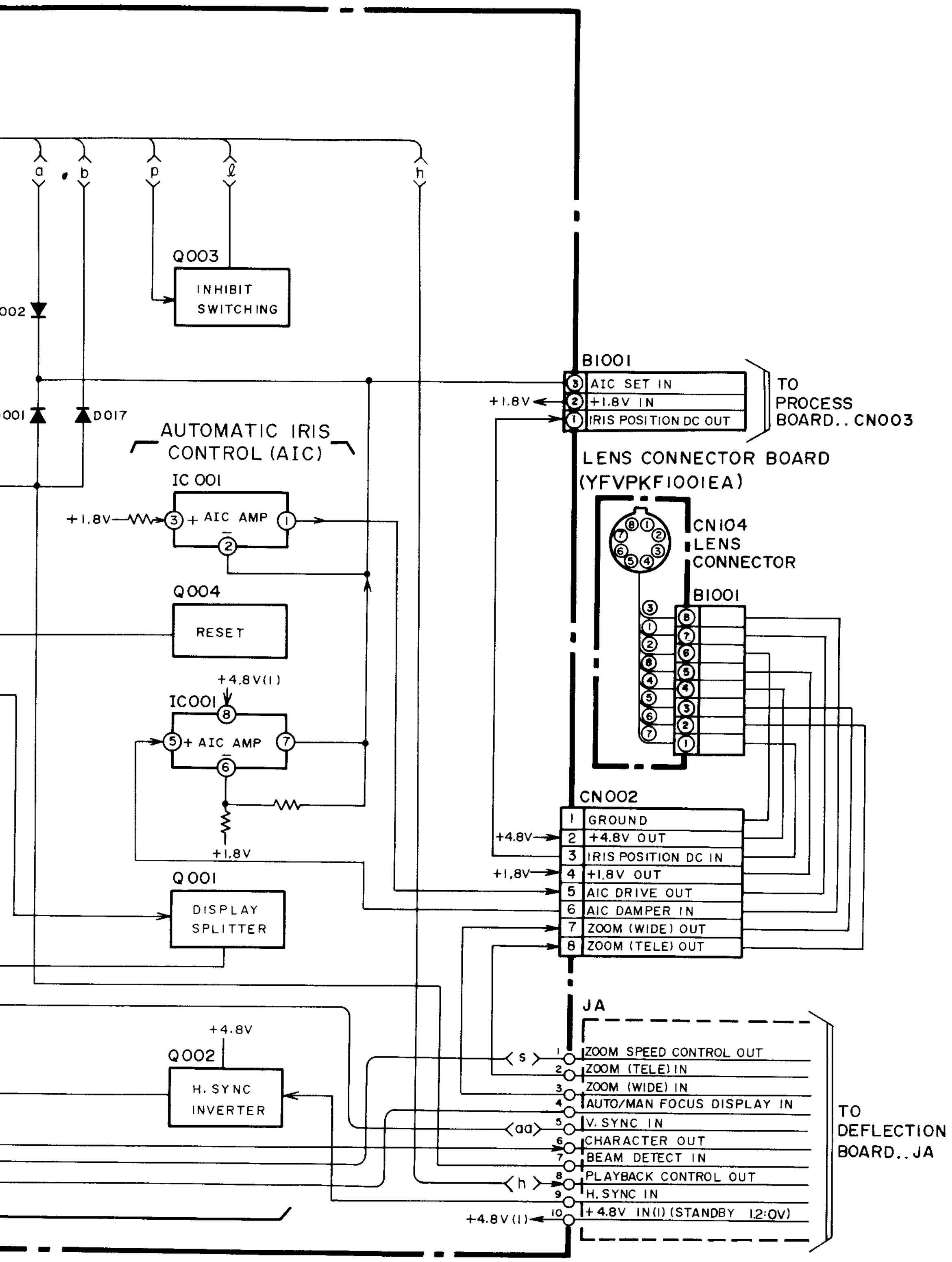

PROCESS BOARD (YFVPKC1001EA)
WHITE SET SWITCH BOARD (YFVPKB0806EA)
INDOOR
SW002 INDOOR/ OUTDOOR SWITCH
OUTDOOR
SET
SW001 WHITE SET SWITCH
WHITE BALANCE
CN001
GROUND
INDOOR/OUTDOOR SWITCH IN
WHITE SET SWITCH IN
TO PREAMPLIFIER BOARD
CN002
TARGET VOLTAGE OUT
+8.6V OUT (STANDBY 1&2:0V)
PRE VIDEO IN
+8.6V
TO MICRO PROCESSOR BOARD
CN003
+1.8V OUT
AIC SET OUT
IRIS POSITION DC IN
+1.8V
SIGNAL PROCESSING
H. APERTURE SIGNAL GENERATOR
PAL SIGNAL PROCESSING
+4.8V
+1.8V
IC001
AMP
OB CLAMP
PRE BL MIX
GAMMA CORRECTION
AGC
AMP
YH WHITE SUPPRESS
Y(EDGE) WHITE SUPPRESS
BIAS LIGHT CORRECTION
PULSE SEPA
AMP
AIC MODULATION
LOW LIGHT INDICATOR
AGC DETECT
AGC CONT
CF001
TRAP
CP1/ PRE BL/ W. BL
TP001
TP003
VR004 AIC SET
VR002 AGC SET
+1.8V VR003 Y GAIN
CF002 Y. LPF
TP002
CF003
DL
IC002
H. APERTURE GENERATOR
Y/CHROMA APERTURE MIX
FADE
NEGA/POSI SELECT
CHARACTER MIX
CLAMP
BL MIX HIGH CLIP LOW CLIP
VIDEO OUT
TP008
CF004 TRAP
SYNC/BURST
CHROMA GAIN CONT
YL PEDESTAL
PULSE SEPA
VR020 R CHROMA CLIP
CF005 YL LPF
VR005 YL PED
CP2/BL/PRE BL
Q002
CHROMA GAIN CONTROL
RED AND BLUE SEPARATION
VR006 Rc/Bc SEPARATION-2
CT001 Rc/Bc SEPARATION-1
CF006 B.P.F
DL001
1H DL
VR006
CT001
IC003
VR007 Rc/Bc GAIN
R/B GAIN CONT
PRE BL MIX
90° PHASE SHIFTER
V. TRANSIENT SPURIOUS CORRECTION
DETECT
MIX
TRACKING SIGNAL GENERATOR
WHITE CLIP
NAM
PULSE SEPA
V. EDGE AMP
+1.8V REG
DL
CF007
TP007
CHROMA ENCODING
IC004
Q002
+2.5V REG
+6V
H. APERTURE SUPPRESS
PULSE SEPA
CP2
W. BL
(B−Y)SC
VR019 BURST PHASE
BFP
B−YL CLAMP
B−YL DETECTION
BFP CLAMP
BFP DETECTION
R−YL CLAMP
R−YL DETECTION
B−YL BALANCE MODULATOR
R−YL BALANCE MODULATOR
CHROMA CLIP/ SUPPRESS
(R−Y)SC
PRE BL
IC013
W. BL
TP013
Hs
W. BL INVERTER
Hs BUFFER
CP2 GENERATOR
Q004
PRE BL MIX
VR008 CHROMA GAIN
Q005,Q014
BURST GATE
VR009 BURST LEVEL
Q006
BURST PHASE SHIFTER
CT002 CHROMA PHASE
SYNC/BURST
CP2/BL/PRE B
PRE B
CP1/PRE BL W. BL
CHROMA PROCESSING
VR010 B TRACKING−3
VR011 B TRACKING−2
VR012 B TRACKING−1
VR010
VR011
VR012
IC005
B. SHADING/ TRACKING CORRECTION
GAIN CONTROL
PRE BL MIX
AMP
DETECTOR
B−YL AMP
LPF
R/B SEPARATION
PRE BL
R. SHADING/ TRACKING CORRECTION
GAIN CONTROL
PRE BL MIX
AMP
DETECTOR
R−YL AMP
LPF
VR015 R TRACKING−3
VR014 R TRACKING−2
VR016 R TRACKING−1
VR015
VR014
VR016
+4.8V
VR017 R GAIN
VR018 R PED
+1.8V
IC012
BUFFER
BUFFER
Q001
YL+B MATRIX
ON
OFF
SW001 YL ON/OFF SWITCH
+1.8V
AUTOMATIC WHITE BALANCE SETTING
IC010(a)
LEVEL COMPARATOR
IC010(b)
LEVEL COMPARATOR
UP/DOWN COUNTER
D/A CONVERTER
COUNTER CONTROL
AWC WARNING
RESET
UP/DOWN COUNTER
D/A CONVERTER
Vs
IC009


V. EDGE SIGNAL GENERATOR AND REC CONTROL
IC006
FADE/REC CONTROL
L:PAUSE
H:RUN
REC DISPLAY
FADE DISPLAY
STANDBY:H
BATTERY WARNING
Y(EDGE) MODULATOR
DETECTOR
DIFF AMP
LPF
CF008
DL003
1H DL
VR013
V EDGE BALANCE
Q015
STANDBY CONTROL
VR001
MAN GAIN
+4.8V
+12V
SC
VIDEO OUT
TP008
CF004
TRAP
PULSE GENERATOR
IC013
W. BL INVERTER
Hs BUFFER
CP2 GENERATOR
IC011
V. RESET
LSW
SC BL
W. BL
BFP
SYNC
BL
Vs
PRE BL
CP1
Hs
Vss
OSC OUT
OSC IN
FILTER OUT
FILTER IN
(R−Y) SC
BSC
(B−Y) SC
4fSC
VDD
L015
VCO ADJ
TP009
TP010
TP011
TP012
CT003
4.43MHz ADJ
Q007
OSC CONTROL
SYNC/BURST
BURST PHASE SHIFTER
CT002
CHROMA PHASE
CP2/BL/PRE BL
CP1/PRE BL/W. BL
CORRECTION SIGNAL AMP
IC008(b)
DYNAMIC FOCUS CORR. AMP
TP004
IC008(a)
BIAS LIGHT SHADING CORR. AMP
TP005
CN005
1 COLOR BALANCE IN
2 AGC MAN OUT
3 AGC AUTO OUT
4 IRIS AUTO/MAN CONTROL IN
5 FADE/REC SWITCH IN
6 VTR COMPATIBILITY SWITCH IN
7 AGC SELECT IN
TO IRIS/COLOR ADJUST BOARD
JB
1 FADE/REC SWITCH IN
2 LEVELE INDICATOR OUT
3 TARGET VOLTAGE IN
4 BIAS LIGHT CORRECTION (−) IN
5 BIAS LIGHT CORRECTION (+) IN
6 +8.6V IN (STANDBY 1&2:0V)
7 +1.8V OUT
8 +4.8V IN (STANDBY 1&2:0V)
9 +8.6V IN
10 DYNAMIC FOCUS OUT
TO DEFLECTION BOARD
JC
1 NOT USED
2 +6V IN
3 Hs OUT
4 Vs OUT
5 PRE BL OUT
6 FADE CONTROL OUT
7 CHARACTER IN
8 EVF VIDEO OUT
9 +12V IN
10 GROUND
11 +4.8V IN
TO DEFLECTION BOARD
JD
1 GROUND
2 +4.8V OUT
3 PLAY BACK CONTROL IN
4 INDICATOR INHIBIT IN
5 NEGA/POSI CONTROL IN
6 BATTERY WARNING (1) OUT
7 BATTERY WARNING (2) OUT
8 REC CONTROL OUT
9 REC RESET IN
10 PLAY BACK OSC CONTROL IN
11 PLAY BACK DC OUT
12 REC SIGNAL OUT
13 FADE SIGNAL OUT
14 RESET IN
15 LOW LIGHT SIGNAL OUT
16 AWC RESET IN
17 WHITE BALANCE WARNING OUT
18 SERIAL CLOCK OUT
19 SERIAL DATA IN/OUT
20 INDOOR/OUTDOOR SWITCH OUT
TO MICRO PROCESSOR BOARD
CN006
1 SERIAL DATA IN/OUT PIN3
2 SERIAL CLOCK IN PIN4
3 STANDBY OUT PIN5
4 VTR REC CONTROL OUT PIN6
5 PAL OUT PIN1
6 GROUND PIN2
TO VTR CONNECTOR CN110
CN001
1 Vs OUT
2 Hs OUT
3 GROUND
4 +8.6V OUT (STANDBY 1&2:0V)
5 +1.8V OUT
6 BLUE SHADING CORRECTION IN
7 RED SHADING CORRECTION IN
8 DYNAMIC FOCUS CORRECTION IN
9 BIAS LIGHT SHADING CORRECTION IN
TO CORRECTION BOARD

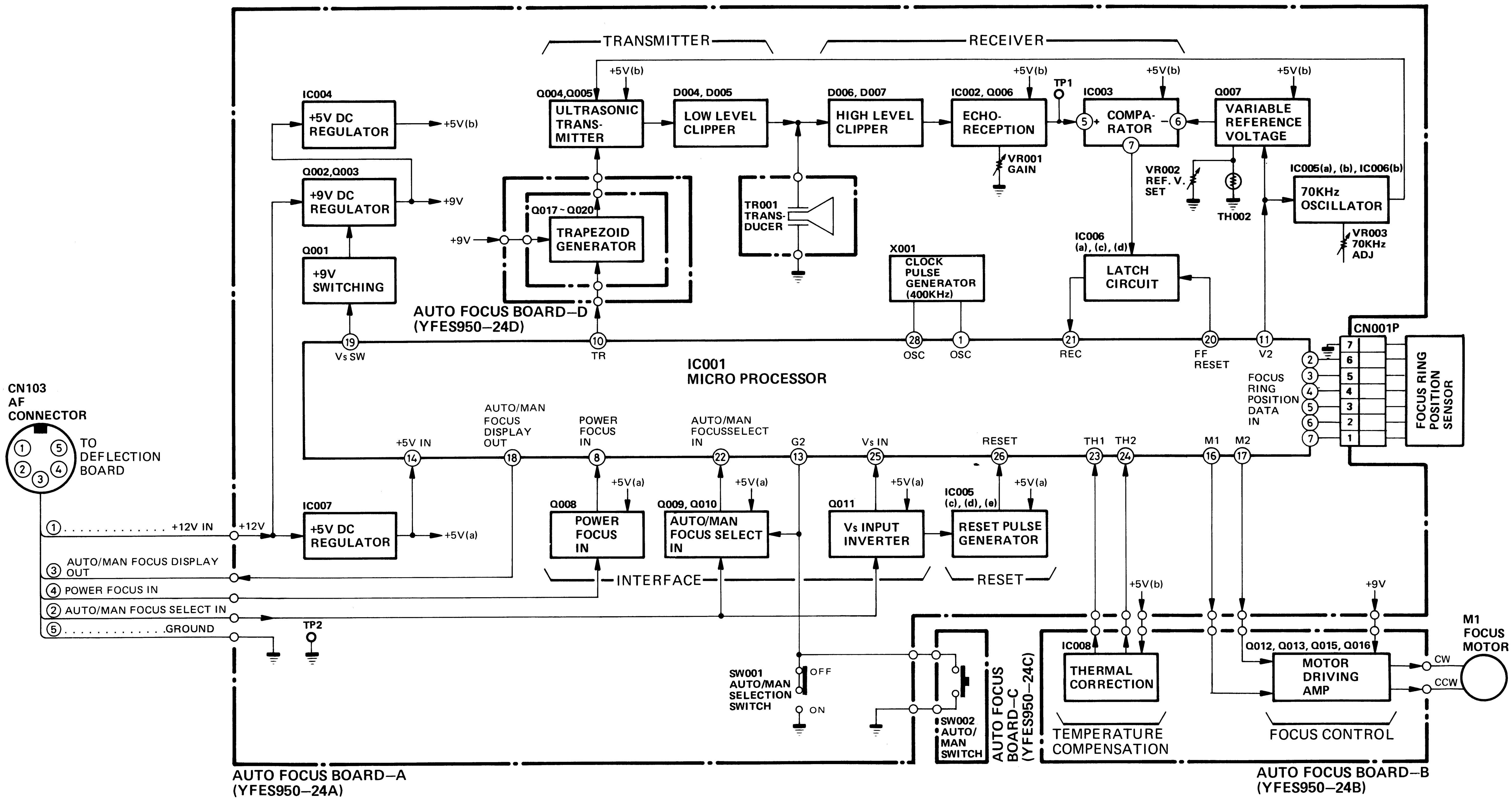
BLOCK DIAGRAM OF MICRO PROCESSOR BOARD (YFVPKD1001EA)



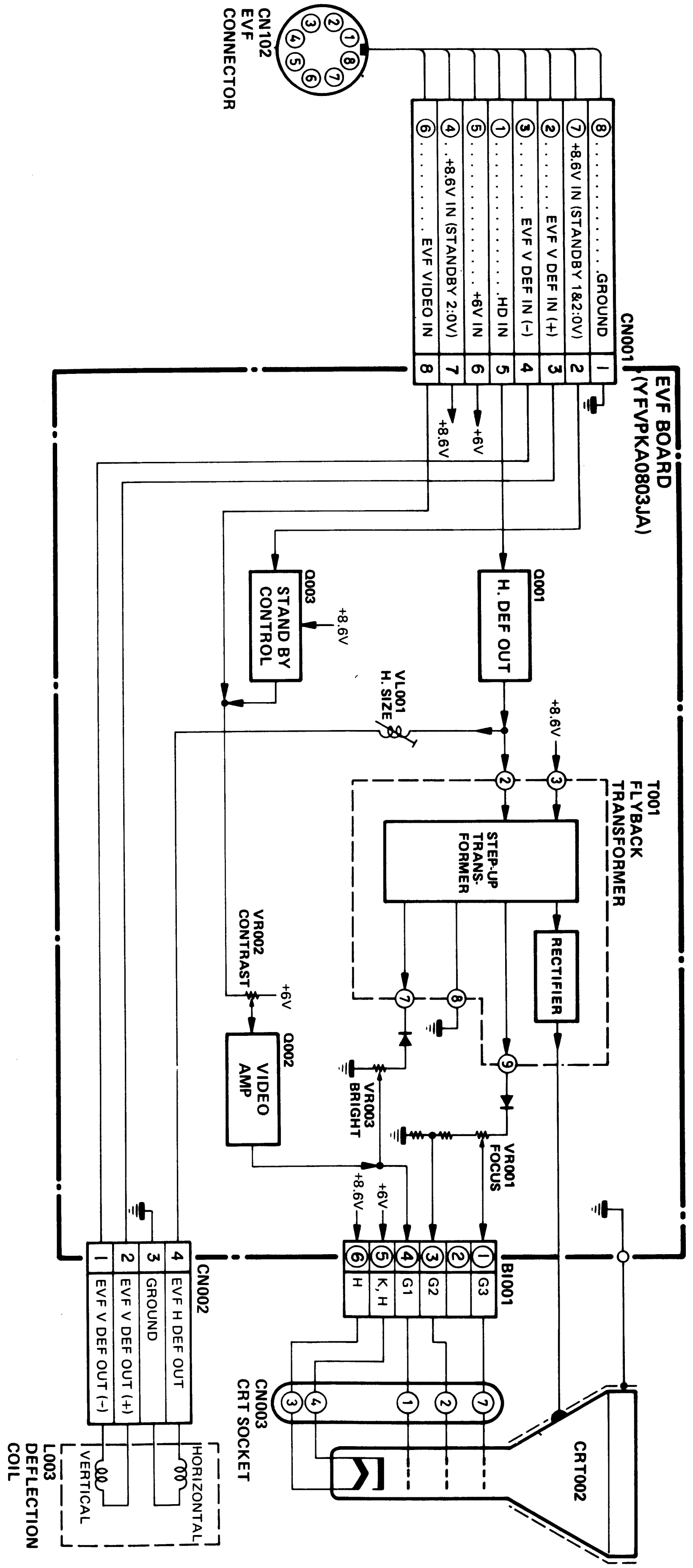
TO PROCESS BOARD ..JD
JD
GROUND
+4.8V IN
PLAYBACK CONTROL OUT
INDICATOR INHIBIT OUT
NEGA/POSI CONTROL OUT
BATTERY WARNING(1) IN
BATTERY WARNING(2) IN
REC CONTROL OUT
REC RESET OUT
PLAYBACK OSC CONTROL OUT
PLAYBACK DC IN
REC SIGNAL IN
FADE SIGNAL IN
RESET OUT
LOW LIGHT SIGNAL IN
AWC RESET OUT
WHITE BALANCE WARNING IN
SERIAL CLOCK IN
SERIAL DATA OUT/IN
INDOOR/OUTDOOR SWITCH IN
+4.8V
INPUT INTERFACE
Q013
FADE SWITCHING
Q012
WHITE BALANCE SWITCHING
Q011
LOW LIGHT SWITCHING
Q010
RECORD SWITCHING
Q016
FOCUS ON/OFF SWITCHING
Q015
AGC ON/OFF SWITCHING
Q009, 014
PLAYBACK SWITCHING
Q008
INDOOR/OUTDOOR SWITCHING
Q007
PLAYBACK/RECORD SWITCHING
Q006
STANDBY SWITCHING
+4.8V (1)
D013
D015
IC002
MICRO PROCESSOR
CO7 CO6 CO5 CO4 CO3 CO2 CO1 CO0
AI3 AI2 AI1 AI0 BI3 BI2 BI1 NC BI0
EO0 EO1 EO2 EO3
CO8 CO9 CO10 CO11 Vss OSC VDD
DO7 DO6 DO5 DO4 DO3 DO2 DO1 DO0 NC
SNS1 SNS0 CSLCT RST TST
+4.8V
X001
IC005
4MHz OSCILLATOR
Vcc
1MHz OUT
IC004
MICRO PROCESSOR
Vss AI3 AI2 AI1 AI0 EO1 TST RST
CO1 CO2 CO3 OSC Vcc SNSO
+4.8V
D002
D001
D017
D004
D003
+1.8V
Q005
SERIAL OUT
IC003
CHARACTER GENERATOR
Vss DA0 DA1 DA2 DA3 DA4 DA5 DA6 LD1 ADM TST
OSC2 OSC1 V.SYNC H.SYNC DO3 DO2 DO1 DOO VO8 VOW VDD
+4.8V(1)
VR001. CHARACTOR SIZE
CHARACTER GENERATOR
TO IRIS/COLOR CONTROL BOARD ..BI002
CN001
+4.8V OUT
AGC DISPLAY IN
ZOOM SPEED CONTROL IN
GROUND
CN003
GROUND
DŌ 0
DŌ 2
DŌ 3
DŌ 4
REC/P.B SELECT IN
AI 0
AI 1
AI 2
AI 3
MICRO PROCESSOR BOARD (YFVPKD1001EA)
EVF DISPLAY SWITCH SELECTION
EVF DISPLAY BOARD (YFVPKE1001EA)
CN001
AIO
REC/PB SELECT IN
GROUND
DO 2
DO 3
AI 2
AI 3
AI 1
VTR REMOTE CONTROL SWITCH SELECTION
VTR REMOTE CONTROL CONNECTOR BOARD (YFVPKK1001EA)
a b c d e f g h i j k l m n o p q r s t u v w x y z
aa bb cc dd ee gg hh ii jj


a
b
p
ℓ
h
Q003
INHIBIT SWITCHING
002
001
D017
AUTOMATIC IRIS CONTROL (AIC)
IC 001
+1.8V
③ + AIC AMP ①
②
Q004
RESET
+4.8V(I)
IC001
⑧
⑤+ AIC AMP ⑦
⑥
+1.8V
Q001
DISPLAY SPLITTER
+4.8V
Q002
H. SYNC INVERTER
B1001
③ AIC SET IN
② +1.8V IN
① IRIS POSITION DC OUT
+1.8V
TO PROCESS BOARD.. CN003
LENS CONNECTOR BOARD (YFVPKF1001EA)
CN104 LENS CONNECTOR
B1001
CN002
1 GROUND
2 +4.8V OUT
3 IRIS POSITION DC IN
4 +1.8V OUT
5 AIC DRIVE OUT
6 AIC DAMPER IN
7 ZOOM (WIDE) OUT
8 ZOOM (TELE) OUT
+4.8V
+1.8V
JA
1 ZOOM SPEED CONTROL OUT
2 ZOOM (TELE) IN
3 ZOOM (WIDE) IN
4 AUTO/MAN FOCUS DISPLAY IN
5 V. SYNC IN
6 CHARACTER OUT
7 BEAM DETECT IN
8 PLAYBACK CONTROL OUT
9 H. SYNC IN
10 +4.8V IN(I) (STANDBY 12.0V)
s
aa
h
+4.8V(I)
TO DEFLECTION BOARD.. JA

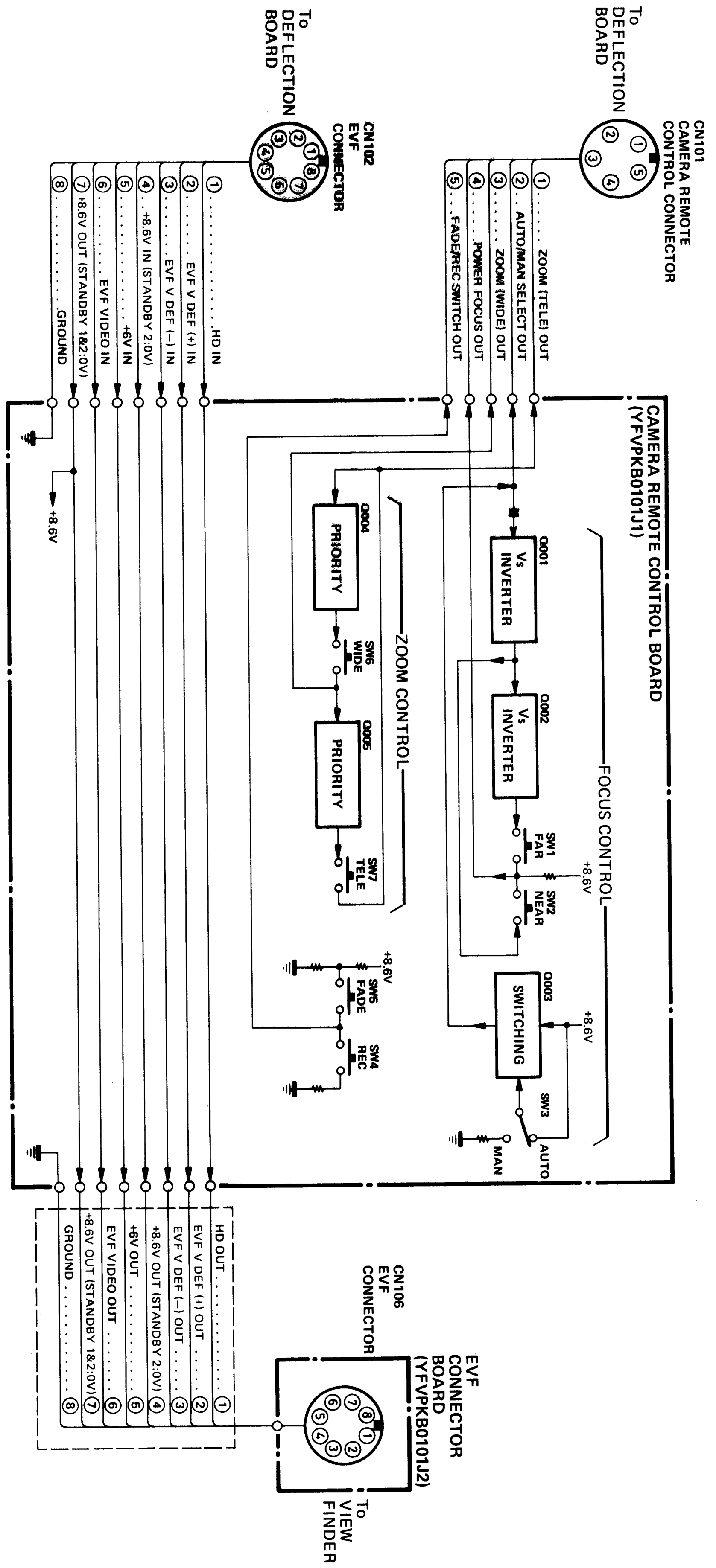
BLOCK DIAGRAM OF AUTO FOCUS BOARD (YFES950–24A, YFES950–24B, YFES950–24C, YFES950–24D)


TRANSMITTER
RECEIVER
IC004
+5V DC REGULATOR
+5V(b)
Q002,Q003
+9V DC REGULATOR
+9V
Q001
+9V SWITCHING
Q004,Q005
ULTRASONIC TRANS-MITTER
D004, D005
LOW LEVEL CLIPPER
D006, D007
HIGH LEVEL CLIPPER
IC002, Q006
ECHO-RECEPTION
VR001 GAIN
TP1
IC003
COMPA-RATOR
Q007
VARIABLE REFERENCE VOLTAGE
VR002 REF. V. SET
TH002
IC005(a), (b), IC006(b)
70KHz OSCILLATOR
VR003 70KHz ADJ
Q017~Q020
TRAPEZOID GENERATOR
AUTO FOCUS BOARD–D (YFES950–24D)
TR001 TRANS-DUCER
X001
CLOCK PULSE GENERATOR (400KHz)
IC006 (a), (c), (d)
LATCH CIRCUIT
CN001P
FOCUS RING POSITION SENSOR
Vs SW
TR
OSC
OSC
REC
FF RESET
V2
IC001 MICRO PROCESSOR
FOCUS RING POSITION DATA IN
CN103 AF CONNECTOR
TO DEFLECTION BOARD
+5V IN
AUTO/MAN FOCUS DISPLAY OUT
POWER FOCUS IN
AUTO/MAN FOCUSSELECT IN
G2
Vs IN
RESET
TH1
TH2
M1
M2
① +12V IN
+12V
③ AUTO/MAN FOCUS DISPLAY OUT
④ POWER FOCUS IN
② AUTO/MAN FOCUS SELECT IN
⑤ GROUND
TP2
IC007
+5V DC REGULATOR
+5V(a)
Q008
POWER FOCUS IN
Q009, Q010
AUTO/MAN FOCUS SELECT IN
Q011
Vs INPUT INVERTER
IC005 (c), (d), (e)
RESET PULSE GENERATOR
INTERFACE
RESET
SW001 AUTO/MAN SELECTION SWITCH
OFF
ON
SW002 AUTO/MAN SWITCH
AUTO FOCUS BOARD–C (YFES950–24C)
IC008
THERMAL CORRECTION
TEMPERATURE COMPENSATION
Q012, Q013, Q015, Q016
MOTOR DRIVING AMP
FOCUS CONTROL
CW
CCW
M1 FOCUS MOTOR
AUTO FOCUS BOARD–A (YFES950–24A)
AUTO FOCUS BOARD–B (YFES950–24B)

BLOCK DIAGRAM OF ELECTRONIC VIEWFINDER BOARD (YFVPKA0803JA)


CN102 EVF CONNECTOR
CN001
⑧ GROUND 1
⑦ +8.6V IN (STANDBY 1&2:0V) 2
② EVF V DEF IN (+) 3
③ EVF V DEF IN (–) 4
① HD IN 5
⑤ +6V IN 6
④ +8.6V IN (STANDBY 2:0V) 7
⑥ EVF VIDEO IN 8
EVF BOARD (YFVPKA0803JA)
+6V
+8.6V
Q001 H. DEF OUT
Q003 STAND BY CONTROL
+8.6V
VL001 H. SIZE
T001 FLYBACK TRANSFORMER
STEP-UP TRANSFORMER
RECTIFIER
VR002 CONTRAST
+6V
Q002 VIDEO AMP
VR003 BRIGHT
VR001 FOCUS
+8.6V
+6V
B1001
⑥ H
⑤ K, H
④ G1
③ G2
① G3
CN002
4 EVF H DEF OUT
3 GROUND
2 EVF V DEF OUT (+)
1 EVF V DEF OUT (–)
CN003 CRT SOCKET
CRT002
L003 DEFLECTION COIL
HORIZONTAL
VERTICAL

BLOCK DIAGRAM OF CAMERA REMOTE CONTROL BOARD (YFVPKB0101J1)


To DEFLECTION BOARD
CN102 EVF CONNECTOR
① HD IN
② EVF V DEF (+) IN
③ EVF V DEF (–) IN
④ +8.6V IN (STANDBY 2:0V)
⑤ +6V IN
⑥ EVF VIDEO IN
⑦ +8.6V OUT (STANDBY 1&2:0V)
⑧ GROUND
To DEFLECTION BOARD
CN101 CAMERA REMOTE CONTROL CONNECTOR
① ZOOM (TELE) OUT
② AUTO/MAN SELECT OUT
③ ZOOM (WIDE) OUT
④ POWER FOCUS OUT
⑤ FADE/REC SWITCH OUT
CAMERA REMOTE CONTROL BOARD (YFVPKB0101J1)
+8.6V
Q004 PRIORITY
SW6 WIDE
Q005 PRIORITY
SW7 TELE
ZOOM CONTROL
Q001 Vs INVERTER
Q002 Vs INVERTER
SW1 FAR
SW2 NEAR
+8.6V
FOCUS CONTROL
+8.6V
SW5 FADE
SW4 REC
Q003 SWITCHING
+8.6V
SW3
AUTO
MAN
CN106 EVF CONNECTOR
HD OUT ①
EVF V DEF (+) OUT ②
EVF V DEF (–) OUT ③
+8.6V OUT (STANDBY 2:0V) ④
+6V OUT ⑤
EVF VIDEO OUT ⑥
+8.6V OUT (STANDBY 1&2:0V) ⑦
GROUND ⑧
EVF CONNECTOR BOARD (YFVPKB0101J2)
To VIEW FINDER

SCHEMATIC DIAGRAM OF DEFLECTION BO

DEFLECTION BOARD

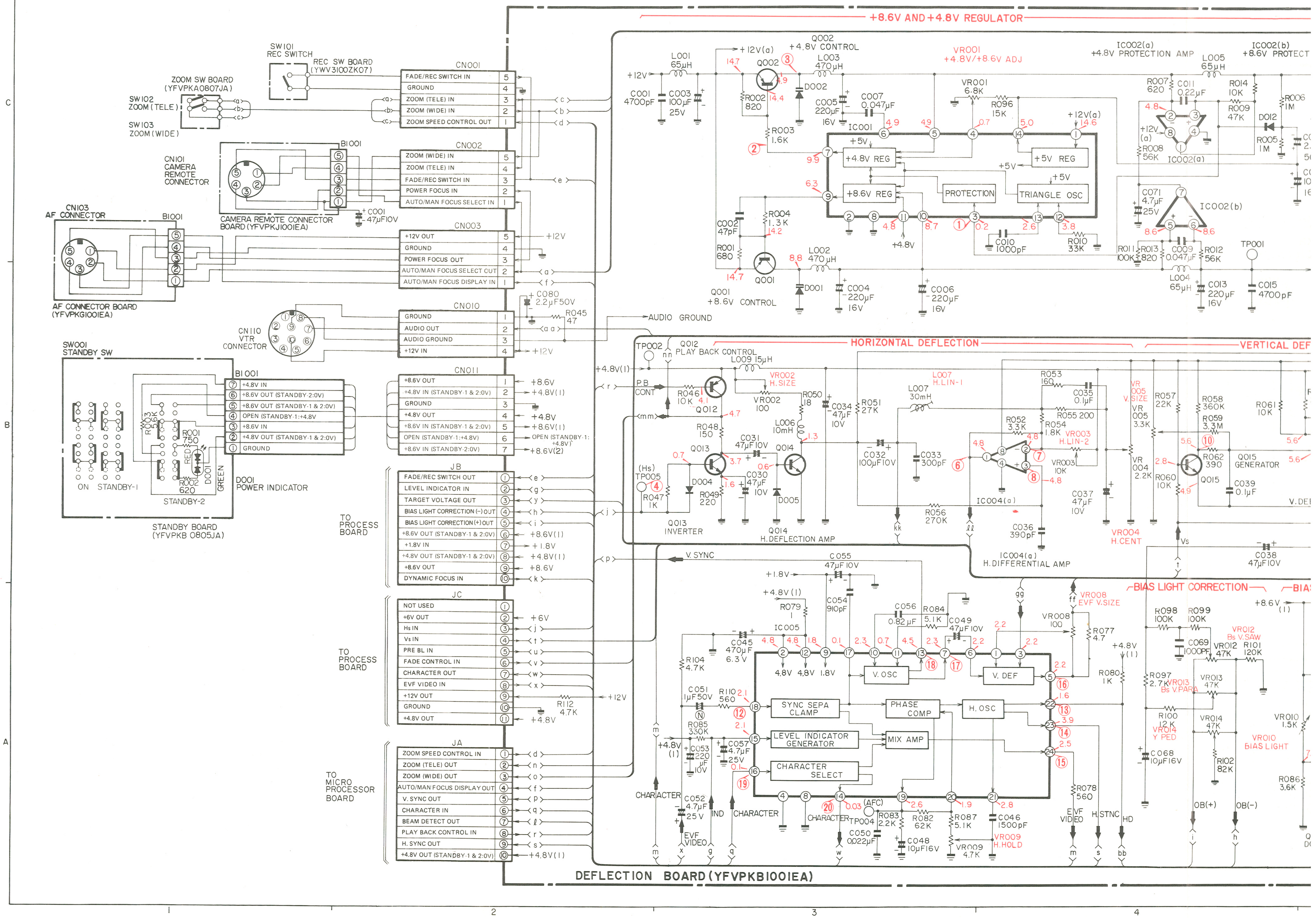
IC001	NJM2048M	C3
IC002	NJM2903M	C4
IC003	NJM3415M	B5, C6
IC004	NJM3415M	B4, B5
IC005	AN2510	A3
Q001	2SA715-BC	C3
Q002	2SA715-BC	C3
Q003	2SB641-QRS	C5
Q004	2SB641-QRS	C5
Q005	2SB641-QRS	C5
Q006	2SB641-QRS	C5
Q007	2SB745-STU	C6
Q008	2SD636-QR	C6
Q009	2SC1327-STU	C6
Q010	2SD636-QR	C7
Q011	2SD661-STU	C7
Q012	2SB643-QRS	B3
Q013	2SD638-QR	B3
Q014	2SD975	B3
Q015	2SD661-STU	B4
Q016	2SD638-QR	B5
Q017	2SB643-QRS	B5
Q018	2SB788-STU	B6
Q019	2SD958-RST	B6
Q020	2SB788-STU	B6
Q021	2SD639-QRS	B6
Q023	2SD638-QR	A5
Q024	2SD975	A5
Q025	2SB641-QRS	A5
D001	EK14	B3
D002	EK14	C3
D003	MA165	C7
D004	MA165	B3
D005	MA165	B3
D007	MA165	A5
D008	ES01F	A6
D009	MA171	A6
D010	MA171	A6
D012	MA165	C4

STANDBY BOARD

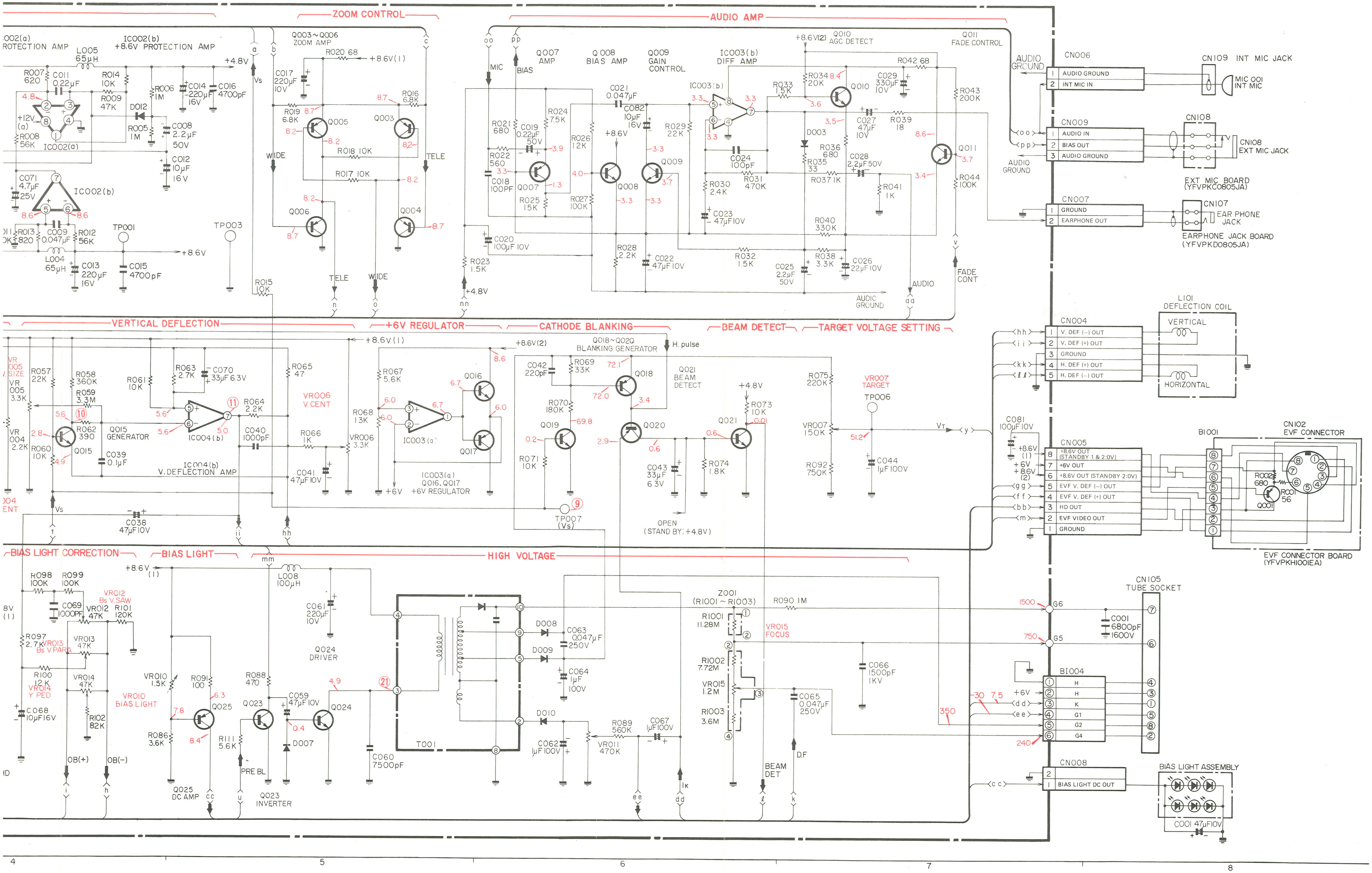
D001	GL9NP2H	B1

EVF CONNECTOR BOARD

Q001	2SB709-QR	B8

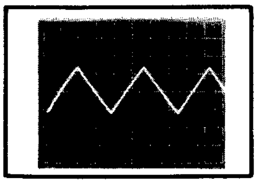

C
B
A
SW101
REC SWITCH
REC SW BOARD
(YWV3100ZK07)
ZOOM SW BOARD
(YFVPKA0807JA)
SW102
ZOOM (TELE)
SW103
ZOOM (WIDE)
CN001
FADE/REC SWITCH IN
GROUND
ZOOM (TELE) IN
ZOOM (WIDE) IN
ZOOM SPEED CONTROL OUT
CN101
CAMERA
REMOTE
CONNECTOR
B1001
CN002
ZOOM (WIDE) IN
ZOOM (TELE) IN
FADE/REC SWITCH IN
POWER FOCUS IN
AUTO/MAN FOCUS SELECT IN
CAMERA REMOTE CONNECTOR
BOARD (YFVPKJ1001EA)
C001
47μF10V
CN103
AF CONNECTOR
CN003
+12V OUT
GROUND
POWER FOCUS OUT
AUTO/MAN FOCUS SELECT OUT
AUTO/MAN FOCUS DISPLAY IN
+12V
AF CONNECTOR BOARD
(YFVPKG1001EA)
C080
2.2μF50V
R045
47
CN110
VTR
CONNECTOR
CN010
GROUND
AUDIO OUT
AUDIO GROUND
+12V IN
AUDIO GROUND
SW001
STANDBY SW
CN011
+8.6V OUT
+4.8V IN (STANDBY-1 & 2:0V)
GROUND
+4.8V OUT
+8.6V IN (STANDBY-1 & 2:0V)
OPEN (STANDBY-1:+4.8V)
+8.6V IN (STANDBY-2:0V)
+4.8V IN
+8.6V OUT (STANDBY-2:0V)
+8.6V OUT (STANDBY-1 & 2:0V)
OPEN (STANDBY-1:+4.8V)
+8.6V IN
+4.8V OUT (STANDBY-1 & 2:0V)
GROUND
R003
5.6K
R001
750
R002
620
RED
GREEN
D001
POWER INDICATOR
ON
STANDBY-1
STANDBY-2
STANDBY BOARD
(YFVPKB 0805JA)
JB
FADE/REC SWITCH OUT
LEVEL INDICATOR IN
TARGET VOLTAGE OUT
BIAS LIGHT CORRECTION (−) OUT
BIAS LIGHT CORRECTION (+) OUT
+8.6V OUT (STANDBY-1 & 2:0V)
+1.8V IN
+4.8V OUT (STANDBY-1 & 2:0V)
+8.6V OUT
DYNAMIC FOCUS IN
TO
PROCESS
BOARD
JC
NOT USED
+6V OUT
Hs IN
Vs IN
PRE BL IN
FADE CONTROL IN
CHARACTER OUT
EVF VIDEO IN
+12V OUT
GROUND
+4.8V OUT
R112
4.7K
TO
PROCESS
BOARD
JA
ZOOM SPEED CONTROL IN
ZOOM (TELE) OUT
ZOOM (WIDE) OUT
AUTO/MAN FOCUS DISPLAY OUT
V. SYNC OUT
CHARACTER IN
BEAM DETECT OUT
PLAY BACK CONTROL IN
H. SYNC OUT
+4.8V OUT (STANDBY-1 & 2:0V)
TO
MICRO
PROCESSOR
BOARD
+8.6V AND +4.8V REGULATOR
Q002
+4.8V CONTROL
VR001
+4.8V/+8.6V ADJ
IC002(a)
+4.8V PROTECTION AMP
IC002(b)
+8.6V PROTECT
+4.8V REG
+5V REG
+8.6V REG
PROTECTION
TRIANGLE OSC
IC001
Q001
+8.6V CONTROL
TP001
HORIZONTAL DEFLECTION
VERTICAL DEF
Q012
PLAY BACK CONTROL
VR002
H. SIZE
L007
H. LIN-1
VR003
H. LIN-2
VR005
V. SIZE
Q013
INVERTER
Q014
H. DEFLECTION AMP
IC004(a)
H. DIFFERENTIAL AMP
VR004
H. CENT
Q015
GENERATOR
V. SYNC
IC005
V. OSC
V. DEF
SYNC SEPA
CLAMP
PHASE
COMP
H. OSC
LEVEL INDICATOR
GENERATOR
MIX AMP
CHARACTER
SELECT
VR008
EVF V. SIZE
VR009
H. HOLD
BIAS LIGHT CORRECTION
VR012
Bs V. SAW
VR013
Bs V. PARA
VR014
Y PED
VR010
BIAS LIGHT
CHARACTER
EVF
VIDEO
IND
H. STNC
HD
DEFLECTION BOARD (YFVPKB1001EA)
1
2
3
4

OF DEFLECTION BOARD (YFVPKB1001EA)

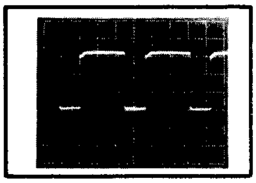

ZOOM CONTROL
AUDIO AMP
VERTICAL DEFLECTION
+6V REGULATOR
CATHODE BLANKING
BEAM DETECT
TARGET VOLTAGE SETTING
BIAS LIGHT CORRECTION
BIAS LIGHT
HIGH VOLTAGE
IC002(a) PROTECTION AMP
IC002(b) +8.6V PROTECTION AMP
Q003~Q006 ZOOM AMP
Q007 AMP
Q008 BIAS AMP
Q009 GAIN CONTROL
IC003(b) DIFF AMP
Q010 AGC DETECT
Q011 FADE CONTROL
AUDIO GROUND
CN006
AUDIO GROUND
INT MIC IN
CN109 INT MIC JACK
MIC 001 INT MIC
CN009
AUDIO IN
BIAS OUT
AUDIO GROUND
CN108
CN108 EXT MIC JACK
EXT MIC BOARD (YFVPKC0805JA)
CN007
GROUND
EARPHONE OUT
CN107
EAR PHONE JACK
EARPHONE JACK BOARD (YFVPKD0805JA)
TELE
WIDE
FADE CONT
TP001
TP003
Q015 GENERATOR
IC004(b) V.DEFLECTION AMP
VR005 V.SIZE
VR006 V.CENT
IC003(a) Q016, Q017 +6V REGULATOR
Q018~Q020 BLANKING GENERATOR
H. pulse
Q021 BEAM DETECT
VR007 TARGET
TP006
TP007 (Vs)
OPEN (STAND BY: +4.8V)
CN004
V. DEF (–) OUT
V. DEF (+) OUT
GROUND
H. DEF (+) OUT
H. DEF (–) OUT
L101 DEFLECTION COIL
VERTICAL
HORIZONTAL
CN005
+8.6V OUT (STANDBY 1 & 2:0V)
+6V OUT
+8.6V OUT (STANDBY 2:0V)
EVF V. DEF (–) OUT
EVF V. DEF (+) OUT
HD OUT
EVF VIDEO OUT
GROUND
B1001
CN102 EVF CONNECTOR
EVF CONNECTOR BOARD (YFVPKH1001EA)
VR012 Bs V.SAW
VR013 Bs V.PARA
VR014 Y PED
VR010 BIAS LIGHT
Q025 DC AMP
Q023 INVERTER
Q024 DRIVER
T001
PRE BL
OB(+)
OB(–)
Z001 (R1001 ~ R1003)
VR015 FOCUS
CN105 TUBE SOCKET
G6
G5
B1004
H
H
K
G1
G2
G4
BEAM DET
DF
CN008
BIAS LIGHT DC OUT
BIAS LIGHT ASSEMBLY
C001 47μF10V
4
5
6
7
8

SIGNAL WAVEFORMS OF DEFLECTION CIRCUIT BOARD

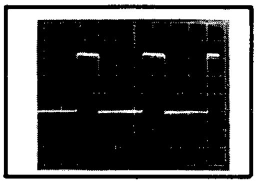
1 0.5V/DIV, 5μs/DIV



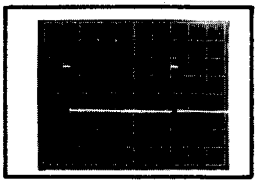
2 5V/DIV, 5μs/DIV



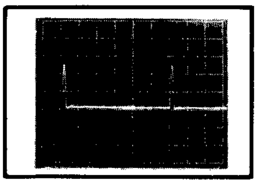
3 5V/DIV, 5μs/DIV



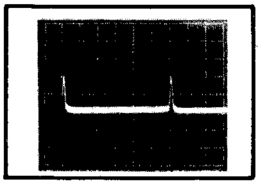
4 2V/DIV, 10μs/DIV



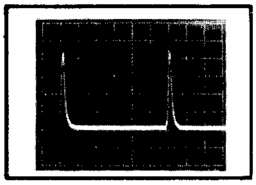
5 50V/DIV, 10μs/DIV



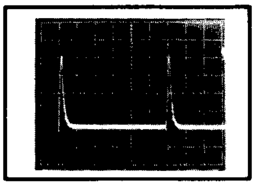
6 0.2V/DIV, 10μs/DIV



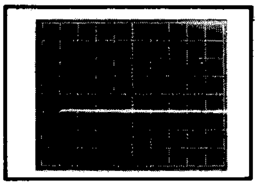
7 0.2V/DIV 10μs/DIV



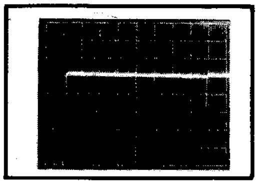
8 0.2V/DIV, 10μs/DIV



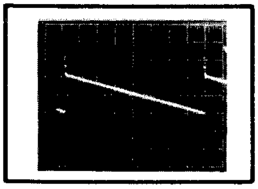
9 2V/DIV, 2ms/DIV



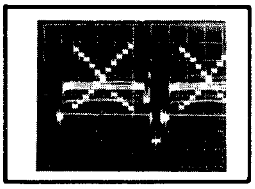
10 0.5V/DIV, 2ms/DIV



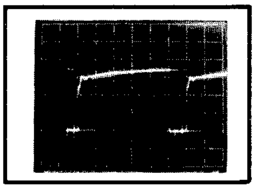
11 2V/DIV, 2ms/DIV



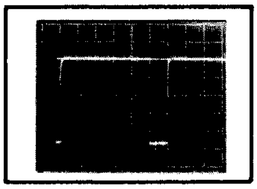
12 0.2V/DIV, 10μs/DIV



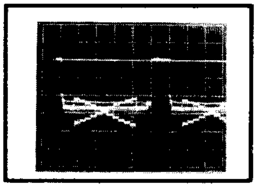
13 0.5V/DIV, 10μs/DIV



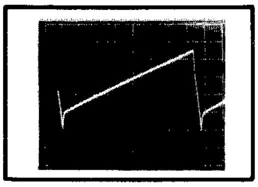
14 1V/DIV, 10μs/DIV



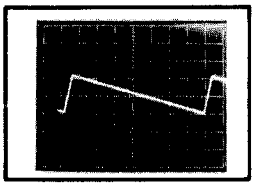
15 1V/DIV, 10μs/DIV



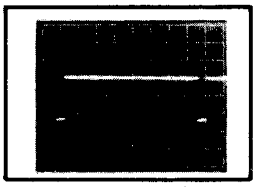
16 0.5V/DIV, 2ms/DIV



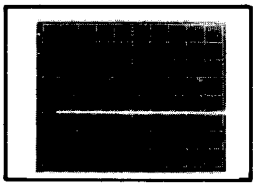
17 0.5V/DIV, 2ms/DIV



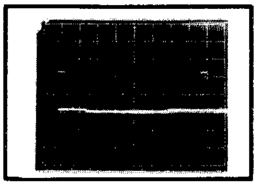
18 2V/DIV, 2ms/DIV



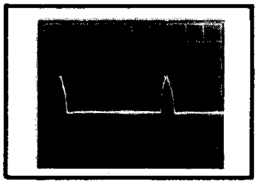
19 2V/DIV, 2ms/DIV



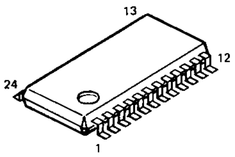
20 0.5V/DIV, 2ms/DIV



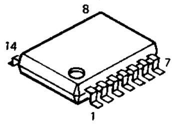
21 50V/DIV, 10μs/DIV



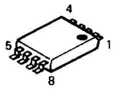
AN2510



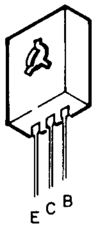
NJM2048M



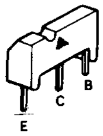
NJM2093M
NJM3415M



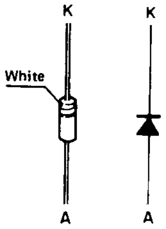
2SA715-BC
2SD975



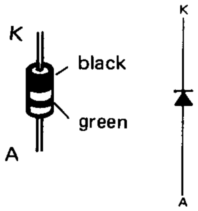
2SB641-QRS
2SB643-QRS
2SB745-STU
2SB788-STU
2SC1327-STU
2SD636-QR
2SD638-QR
2SD639-QRS
2SD661-STU
2SD958-RST



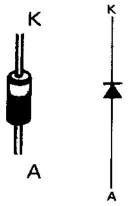
MA165



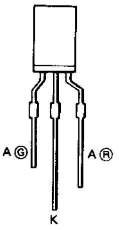
MA171


K
black
green
A
K
A

EK14
ES01F

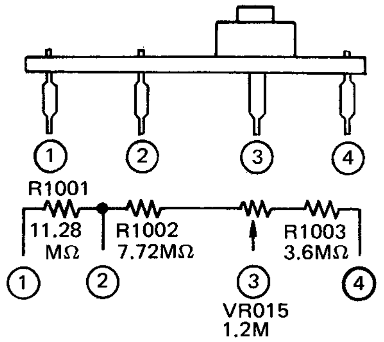


GL9NP2H



BLOCK RESISTOR

Z001 EVM76GA00111


①
②
③
④
R1001
11.28 MΩ
R1002
7.72MΩ
R1003
3.6MΩ
①
②
③
④
VR015
1.2M

DEFLECTION BOARD

DEFLECTION BOARD

IC001	NJM2048M	D3
IC002	NJM2903M	D2
IC003	NJM3415M	D5
IC004	NJM3415M	D6
IC005	AN2510	C5
Q001	2SA715-BC	C3
Q002	2SA715-BC	C3
Q003	2SB641-QRS	C7
Q004	2SB641-QRS	C6
Q005	2SB641-QRS	C7
Q006	2SB641-QRS	C7
Q007	2SB745-STU	D4
Q008	2SD636-QR	D4
Q009	2SC1327-STU	D5
Q010	2SD636-QR	C5
Q011	2SD661-STU	D4
Q012	2SB643-QRS	C6
Q013	2SD638-QR	C6
Q014	2SD975	D6
Q015	2SD661-STU	C6
Q016	2SD638-QR	D6
Q017	2SB643-QRS	D6
Q018	2SB788-STU	C4
Q019	2SD958-RST	C4
Q020	2SB788-STU	C4
Q021	2SD639-QRS	C4
Q023	2SD638-QR	C4
Q024	2SD975	C4
Q025	2SB641-QRS	C4
D001	EK14	D3
D002	EK14	C3
D003	MA165	C5
D004	MA165	C6
D005	MA165	C6
D007	MA165	C4
D008	ES01F	B2
D009	MA171	C3
D010	MA171	C3
D012	MA165	D2

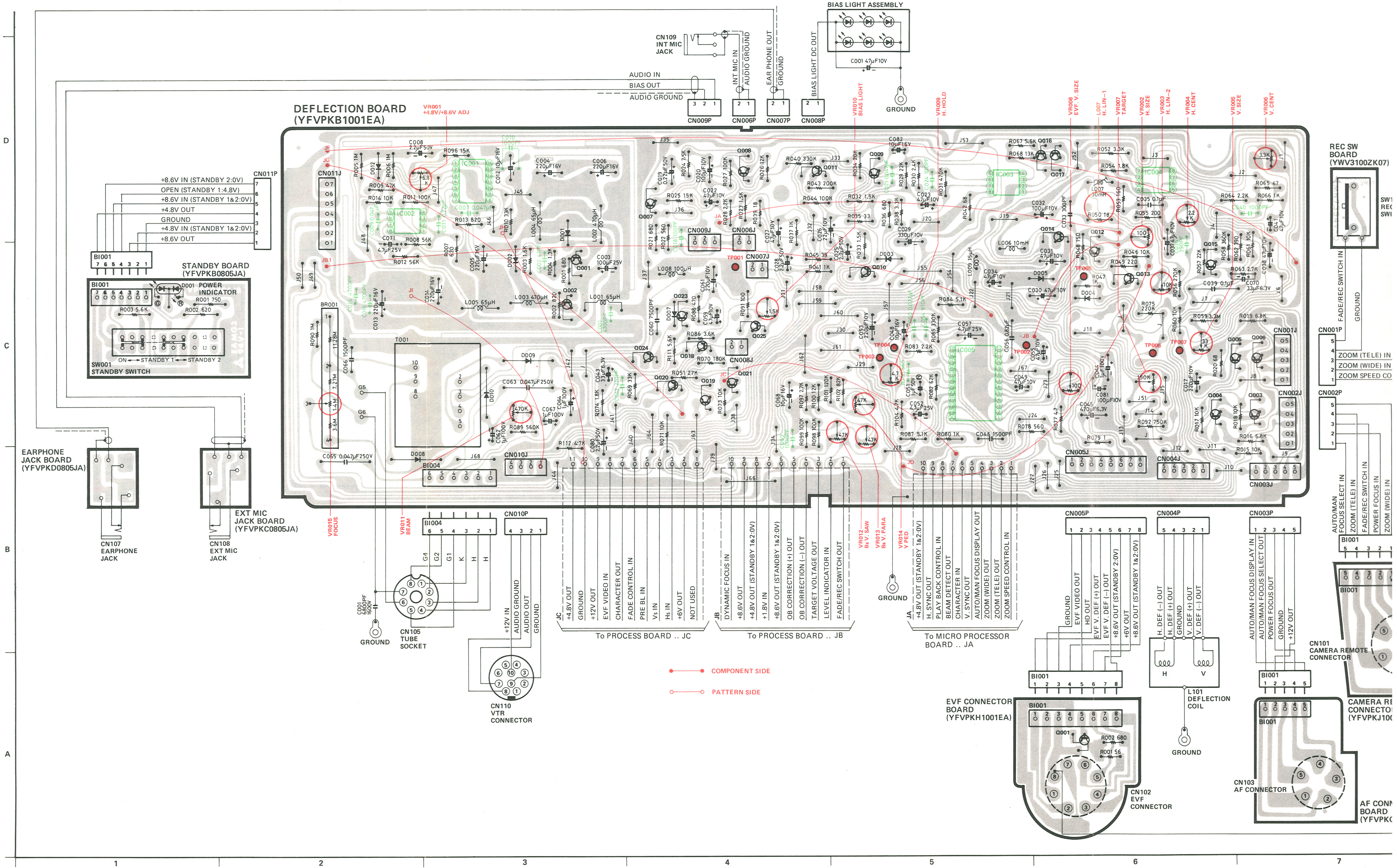
STANDBY BOARD

D001	GL9NP2H	C1

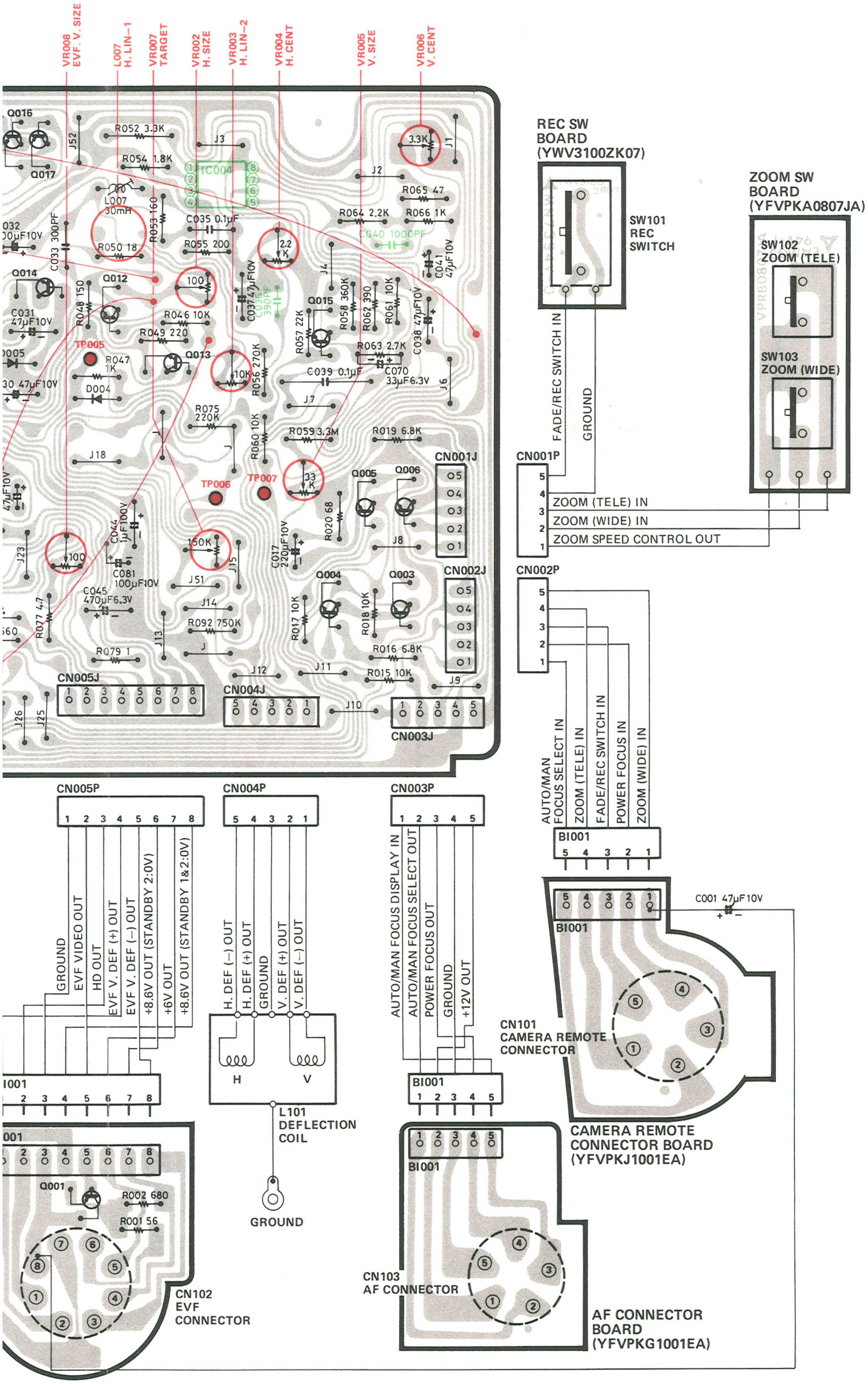
EVF CONNECTOR BOARD

Q001	2SB709-QRS	A6

CONDUCTOR VIEW OF DEFLECTION BOARD (YFVPKB1001EA)

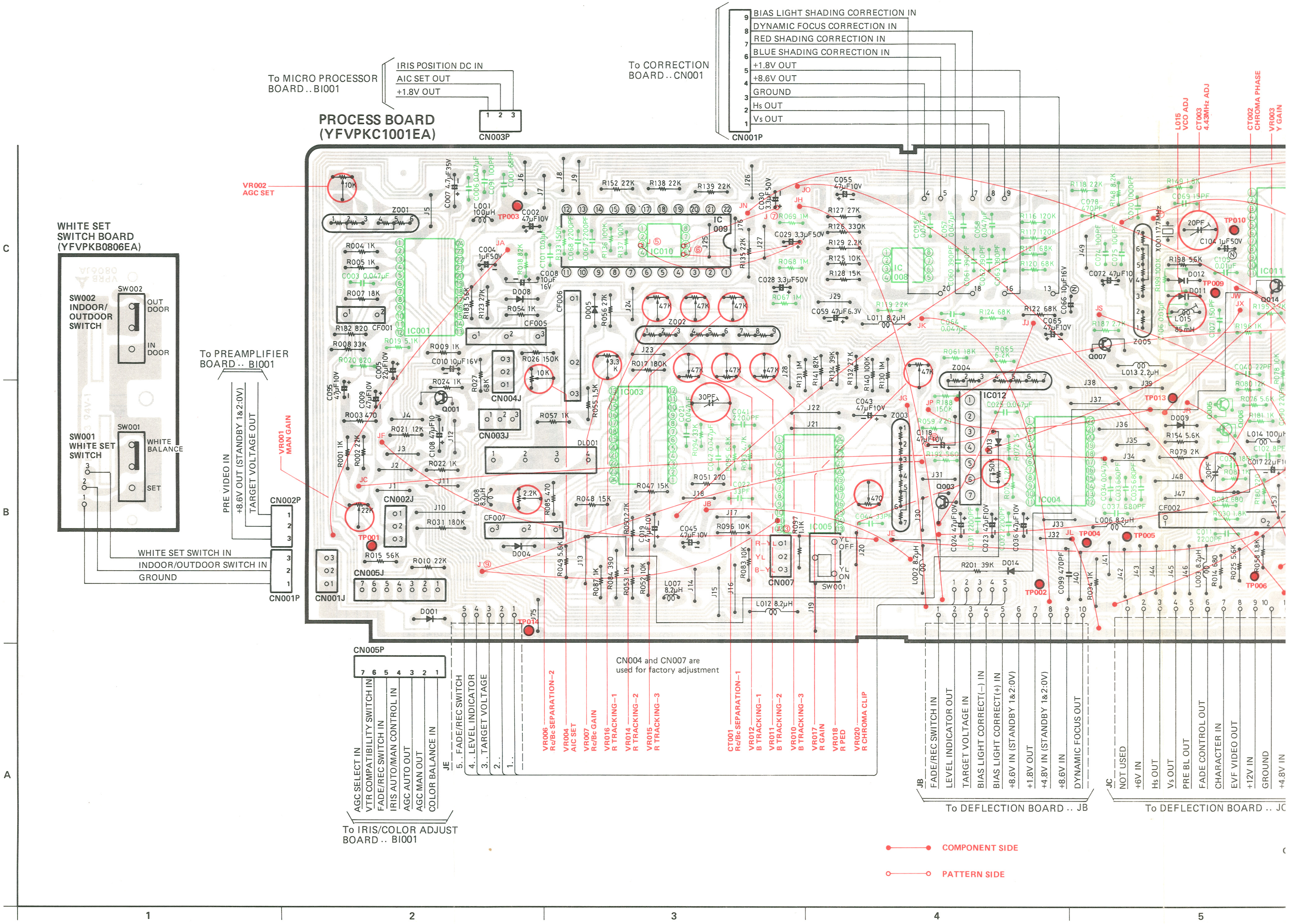


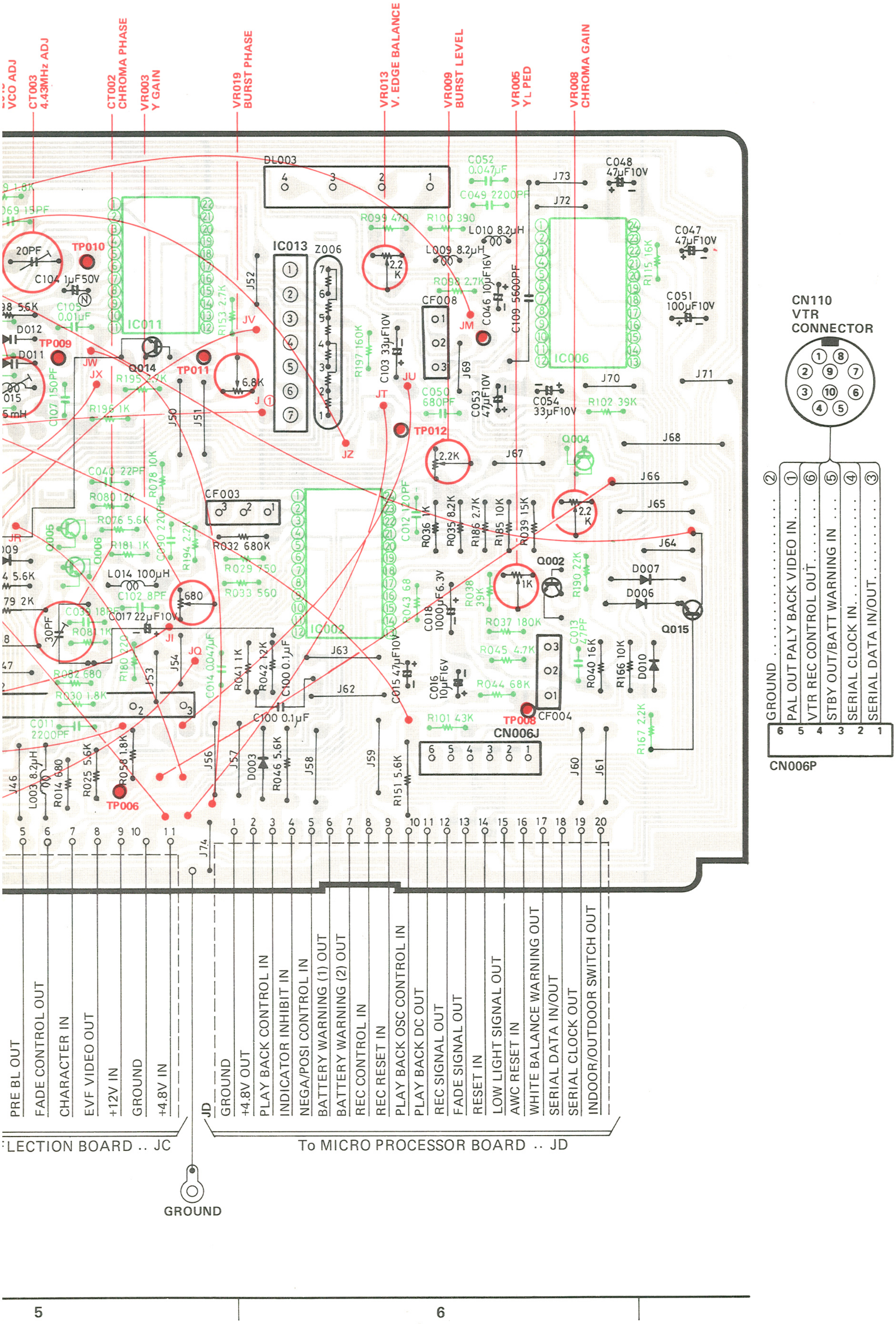
DEFLECTION BOARD (YFVPKB1001EA)
VR001 +4.8V/+8.6V ADJ
CN109 INT MIC JACK
AUDIO IN
BIAS OUT
AUDIO GROUND
INT MIC IN
AUDIO GROUND
EAR PHONE OUT
GROUND
BIAS LIGHT DC OUT
BIAS LIGHT ASSEMBLY
C001 47μF10V
GROUND
CN009P
CN006P
CN007P
CN008P
VR010 BIAS LIGHT
VR009 H. HOLD
VR008 EVF. V. SIZE
L007 H. LIN—1
VR007 TARGET
VR002 H. SIZE
VR003 H. LIN—2
VR004 H. CENT
VR005 V. SIZE
VR006 V. CENT
REC SW BOARD (YWV3100ZK07)
FADE/REC SWITCH IN
GROUND
CN001P
ZOOM (TELE) IN
ZOOM (WIDE) IN
ZOOM SPEED CO
CN002P
CN011P
+8.6V IN (STANDBY 2:0V)
OPEN (STANDBY 1:4.8V)
+8.6V IN (STANDBY 1&2:0V)
+4.8V OUT
GROUND
+4.8V IN (STANDBY 1&2:0V)
+8.6V OUT
B1001
STANDBY BOARD (YFVPKB0805JA)
D001 POWER INDICATOR
R001 750
R003 5.6K
R002 620
SW001 STANDBY SWITCH
ON ← STANDBY 1 → STANDBY 2
EARPHONE JACK BOARD (YFVPKD0805JA)
CN107 EARPHONE JACK
EXT MIC JACK BOARD (YFVPKC0805JA)
CN108 EXT MIC JACK
VR015 FOCUS
VR011 BEAM
B1004
G1 G2 G1 K H H
C001 6800PF 1600V
GROUND
CN105 TUBE SOCKET
CN010P
+12V IN
AUDIO GROUND
AUDIO OUT
GROUND
CN110 VTR CONNECTOR
JC
+4.8V OUT
GROUND
+12V OUT
EVF VIDEO IN
CHARACTER OUT
FADE CONTROL IN
PRE BL IN
Vs IN
Hs IN
+6V OUT
NOT USED
To PROCESS BOARD .. JC
JB
DYNAMIC FOCUS IN
+8.6V OUT
+4.8V OUT (STANDBY 1&2:0V)
+1.8V IN
+8.6V OUT (STANDBY 1&2:0V)
OB CORRECTION (+) OUT
OB CORRECTION (—) OUT
TARGET VOLTAGE OUT
LEVEL INDICATOR IN
FADE/REC SWITCH OUT
To PROCESS BOARD .. JB
VR012 Bs V. SAW
VR013 Bs V. PARA
VR014 Y PED
GROUND
JA
+4.8V OUT (STANDBY 1&2:0V)
H. SYNC OUT
PLAY BACK CONTROL IN
BEAM DETECT OUT
CHARACTER IN
V. SYNC OUT
AUTO/MAN FOCUS DISPLAY OUT
ZOOM (WIDE) OUT
ZOOM (TELE) OUT
ZOOM SPEED CONTROL IN
To MICRO PROCESSOR BOARD .. JA
COMPONENT SIDE
PATTERN SIDE
CN005P
GROUND
EVF VIDEO OUT
HD OUT
EVF V. DEF (+) OUT
EVF V. DEF (—) OUT
+8.6V OUT (STANDBY 2:0V)
+6V OUT
+8.6V OUT (STANDBY 1&2:0V)
CN004P
H. DEF (—) OUT
H. DEF (+) OUT
GROUND
V. DEF (+) OUT
V. DEF (—) OUT
H
V
L101 DEFLECTION COIL
GROUND
CN003P
AUTO/MAN FOCUS DISPLAY IN
AUTO/MAN FOCUS SELECT OUT
POWER FOCUS OUT
GROUND
+12V OUT
AUTO/MAN FOCUS SELECT IN
ZOOM (TELE) IN
ZOOM (WIDE) IN
FADE/REC SWITCH IN
POWER FOCUS IN
ZOOM (WIDE) IN
CN101 CAMERA REMOTE CONNECTOR
EVF CONNECTOR BOARD (YFVPKH1001EA)
B1001
Q001
R002 680
R001 56
CN102 EVF CONNECTOR
CAMERA RE CONNECTOR (YFVPKJ10
CN103 AF CONNECTOR
AF CONN BOARD (YFVPK
IC001
IC002
IC003
IC004
IC005
T001
BR001
CN001J
CN002J
CN003J
CN004J
CN005J
CN006J
CN007J
CN008J
CN009J
CN010J
CN011J
TP001
TP002
TP003
TP004
TP005
TP006
TP007
D
C
B
A
1
2
3
4
5
6
7


VR008 EVF. V. SIZE
L007 H. LIN-1
VR007 TARGET
VR002 H. SIZE
VR003 H. LIN-2
VR004 H. CENT
VR005 V. SIZE
VR006 V. CENT
Q016
Q017
J52
R052 3.3K
R054 1.8K
J3
IC004
L007 30mH
R053 160
C035 0.1μF
R055 200
R050 18
C033 300PF
Q014
Q012
R048 150
C031 47μF10V
R046 10K
R049 220
TP005
R047 1K
Q013
D004
R075 220K
J18
TP006
TP007
C044 1μF100V
C081 100μF10V
C045 470μF6.3V
R077 4.7
R079 1
J23
J26
J25
J51
J14
R092 750K
J13
J12
J11
J10
J2
J1
3.3K
R065 47
R064 2.2K
R066 1K
C040 1000PF
C041 47μF10V
2.2K
100
C037 47μF10V
C036 390PF
J4
Q015
R058 360K
R062 390
R061 10K
C038 47μF10V
R057 22K
R063 2.7K
C070 33μF6.3V
C039 0.1μF
10K
R056 270K
J6
J7
R059 3.3M
R019 6.8K
R060 10K
33K
Q005
Q006
R020 68
C017 220μF10V
150K
J15
100
J8
Q004
Q003
R017 10K
R018 10K
R016 6.8K
R015 10K
J9
CN001J
CN002J
CN003J
CN004J
CN005J
REC SW BOARD (YWV3100ZK07)
SW101 REC SWITCH
FADE/REC SWITCH IN
GROUND
ZOOM SW BOARD (YFVPKA0807JA)
SW102 ZOOM (TELE)
SW103 ZOOM (WIDE)
CN001P
ZOOM (TELE) IN
ZOOM (WIDE) IN
ZOOM SPEED CONTROL OUT
CN002P
AUTO/MAN FOCUS SELECT IN
ZOOM (TELE) IN
FADE/REC SWITCH IN
POWER FOCUS IN
ZOOM (WIDE) IN
BI001
C001 47μF10V
CN101 CAMERA REMOTE CONNECTOR
CAMERA REMOTE CONNECTOR BOARD (YFVPKJ1001EA)
CN005P
GROUND
EVF VIDEO OUT
HD OUT
EVF V. DEF (+) OUT
EVF V. DEF (−) OUT
+8.6V OUT (STANDBY 2:0V)
+6V OUT
+8.6V OUT (STANDBY 1&2:0V)
CN004P
H. DEF (−) OUT
H. DEF (+) OUT
GROUND
V. DEF (+) OUT
V. DEF (−) OUT
H
V
L101 DEFLECTION COIL
GROUND
CN003P
AUTO/MAN FOCUS DISPLAY IN
AUTO/MAN FOCUS SELECT OUT
POWER FOCUS OUT
GROUND
+12V OUT
BI001
CN103 AF CONNECTOR
AF CONNECTOR BOARD (YFVPKG1001EA)
Q001
R002 680
R001 56
CN102 EVF CONNECTOR
6
7

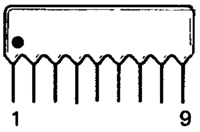
CONDUCTOR VIEW OF PROCESS BOARD (YFVPKC1001EA)

IC001	AN2110S	C2
IC002	AN2210S	B6
IC003	AN2310S	B3
IC004	AN2410S	B5
IC005	AN2320S	B4
IC006	AN2560S	C6
IC008	NJM3414M	C4
IC009	MN6164	C3
IC010	AN6914S	C3
IC011	MN6160PBS	C5
IC012	EHMSB11H44K	B4
IC013	EHMH1115H45S	C6
Q001	2SC2377-CD	B2
Q002	2SD636-QRS	B6
Q003	2SC828-QRS	B4
Q004	2SD601-QRS	C6
Q005	2SC2404-CD	B5
Q006	2SC2404-CD	B5
Q007	2SB643-QRS	C5
Q014	2SC2377-CD	C5
Q015	2SC828-QRS	B7
D001	MA165	B2
D003	MA165	B6
D004	MA165	B2
D005	MA165	C3
D006	MA165	B7
D007	MA165	B7
D008	MA165	C2
D009	MA165	B5
D010	MA165	B7
D011	YUD1S2688	C5
D012	YUD1S2688	C5
D013	MA165	B4
D014	MA165	B4


PROCESS BOARD (YFVPKC1001EA)
WHITE SET SWITCH BOARD (YFVPKB0806EA)
SW002 INDOOR/OUTDOOR SWITCH
OUT DOOR
IN DOOR
SW001 WHITE SET SWITCH
WHITE BALANCE
SET
WHITE SET SWITCH IN
INDOOR/OUTDOOR SWITCH IN
GROUND
CN001P
To PREAMPLIFIER BOARD .. BI001
PRE VIDEO IN
+8.6V OUT (STANDBY 1&2:0V)
TARGET VOLTAGE OUT
CN002P
VR001 MAN GAIN
VR002 AGC SET
To MICRO PROCESSOR BOARD .. BI001
IRIS POSITION DC IN
AIC SET OUT
+1.8V OUT
CN003P
To CORRECTION BOARD .. CN001
BIAS LIGHT SHADING CORRECTION IN
DYNAMIC FOCUS CORRECTION IN
RED SHADING CORRECTION IN
BLUE SHADING CORRECTION IN
+1.8V OUT
+8.6V OUT
GROUND
Hs OUT
Vs OUT
CN001P
L015 VCO ADJ
CT003 4.43MHz ADJ
CT002 CHROMA PHASE
VR003 Y GAIN
IC001
IC003
IC004
IC005
IC008
IC009
IC010
IC011
IC012
CN002J
CN003J
CN004J
CN005J
CN001J
CN007
SW001
TP001
TP002
TP003
TP004
TP005
TP006
TP009
TP010
TP013
TP014
CN005P
AGC SELECT IN
VTR COMPATIBILITY SWITCH IN
FADE/REC SWITCH IN
IRIS AUTO/MAN CONTROL IN
AGC AUTO OUT
AGC MAN OUT
COLOR BALANCE IN
To IRIS/COLOR ADJUST BOARD .. BI001
JE
5 .. FADE/REC SWITCH
4 .. LEVEL INDICATOR
3 .. TARGET VOLTAGE
2 ..
1 ..
VR006 Rc/Bc SEPARATION-2
VR004 AIC SET
VR007 Rc/Bc GAIN
VR016 R TRACKING-1
VR014 R TRACKING-2
VR015 R TRACKING-3
CN004 and CN007 are used for factory adjustment
CT001 Rc/Bc SEPARATION-1
VR012 B TRACKING-1
VR011 B TRACKING-2
VR010 B TRACKING-3
VR017 R GAIN
VR018 R PED
VR020 R CHROMA CLIP
JB
FADE/REC SWITCH IN
LEVEL INDICATOR OUT
TARGET VOLTAGE IN
BIAS LIGHT CORRECT(-) IN
BIAS LIGHT CORRECT(+) IN
+8.6V IN (STANDBY 1&2:0V)
+1.8V OUT
+4.8V IN (STANDBY 1&2:0V)
+8.6V IN
DYNAMIC FOCUS OUT
To DEFLECTION BOARD .. JB
JC
NOT USED
+6V IN
Hs OUT
Vs OUT
PRE BL OUT
FADE CONTROL OUT
CHARACTER IN
EVF VIDEO OUT
+12V IN
GROUND
+4.8V IN
To DEFLECTION BOARD .. JC
COMPONENT SIDE
PATTERN SIDE
A
B
C
1
2
3
4
5

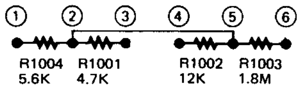

VCO ADJ
CT003 4.43MHz ADJ
CT002 CHROMA PHASE
VR003 Y GAIN
VR019 BURST PHASE
VR013 V. EDGE BALANCE
VR009 BURST LEVEL
VR005 YL PED
VR008 CHROMA GAIN
DL003
IC013
Z006
IC011
IC002
IC006
CF008
CF003
CF004
Q014
Q004
Q002
Q015
TP010
TP009
TP011
TP012
TP008
TP006
CN006J
CN110
VTR
CONNECTOR
CN006P
GROUND
PAL OUT PALY BACK VIDEO IN
VTR REC CONTROL OUT
STBY OUT/BATT WARNING IN
SERIAL CLOCK IN
SERIAL DATA IN/OUT
PRE BL OUT
FADE CONTROL OUT
CHARACTER IN
EVF VIDEO OUT
+12V IN
GROUND
+4.8V IN
LECTION BOARD .. JC
JD
GROUND
+4.8V OUT
PLAY BACK CONTROL IN
INDICATOR INHIBIT IN
NEGA/POSI CONTROL IN
BATTERY WARNING (1) OUT
BATTERY WARNING (2) OUT
REC CONTROL IN
REC RESET IN
PLAY BACK OSC CONTROL IN
PLAY BACK DC OUT
REC SIGNAL OUT
FADE SIGNAL OUT
RESET IN
LOW LIGHT SIGNAL OUT
AWC RESET IN
WHITE BALANCE WARNING OUT
SERIAL DATA IN/OUT
SERIAL CLOCK OUT
INDOOR/OUTDOOR SWITCH OUT
To MICRO PROCESSOR BOARD .. JD
GROUND
5
6

BLOCK RESISTOR

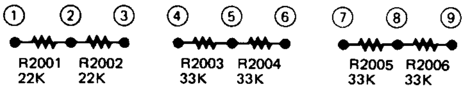


(Dot indicates pin No. 1 side)

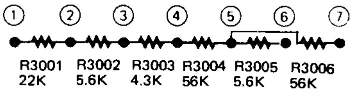
Z001
EXBH84265J


①
②
③
④
⑤
⑥
R1004
5.6K
R1001
4.7K
R1002
12K
R1003
1.8M

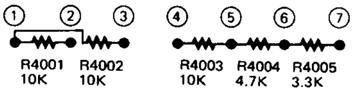
Z002
EXBH86263J


①
②
③
④
⑤
⑥
⑦
⑧
⑨
R2001
22K
R2002
22K
R2003
33K
R2004
33K
R2005
33K
R2006
33K

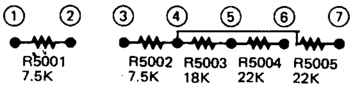
Z003
EXBD86281J


①
②
③
④
⑤
⑥
⑦
R3001
22K
R3002
5.6K
R3003
4.3K
R3004
56K
R3005
5.6K
R3006
56K

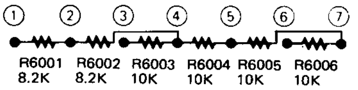
Z004
EXBD85276J


①
②
③
④
⑤
⑥
⑦
R4001
10K
R4002
10K
R4003
10K
R4004
4.7K
R4005
3.3K

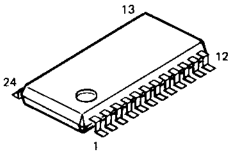
Z005
EXBD85277J


①
②
③
④
⑤
⑥
⑦
R5001
7.5K
R5002
7.5K
R5003
18K
R5004
22K
R5005
22K

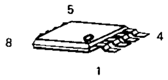
Z006
EXBD86278J


①
②
③
④
⑤
⑥
⑦
R6001
8.2K
R6002
8.2K
R6003
10K
R6004
10K
R6005
10K
R6006
10K

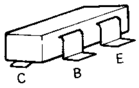
AN2110S
AN2210S
AN2310S
AN2320S
AN2560S



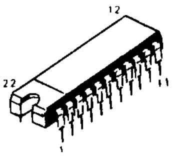
AN6914S
NJM3414M



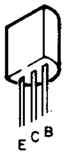
2SC2404-CD



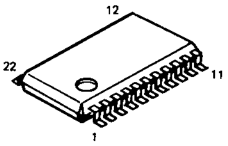
MN6164



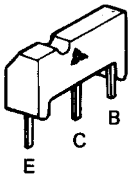
2SC828-QRS



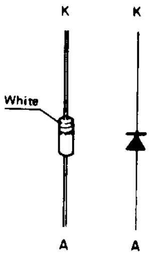
MN6160PBS



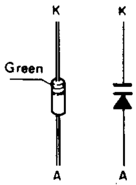
2SC2377-CD
2SB643-QRS
2SD601-QRS
2SD636-QRS



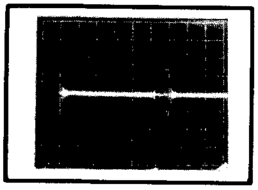
MA165



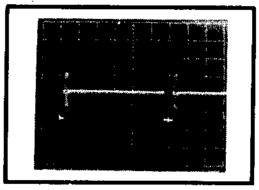
YUD1S2688



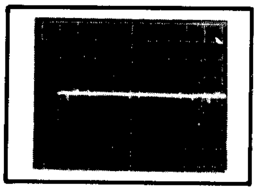
31 0.5V/DIV, 10μs/DIV



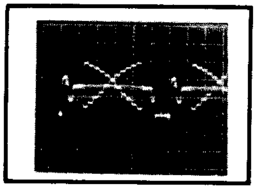
32 0.2V/DIV, 10μs/DIV



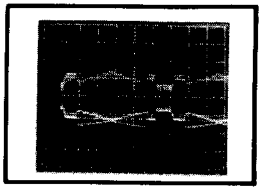
33 0.1V/DIV, 10μs/DIV



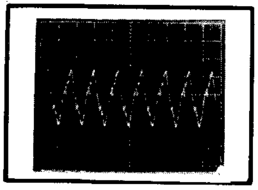
34 0.1V/DIV, 10μs/DIV



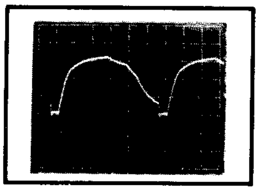
35 0.5V/DIV, 10μs/DIV



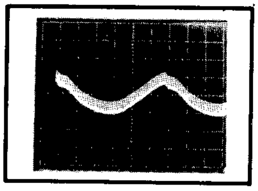
36 0.1V/DIV, 0.2μs/DIV



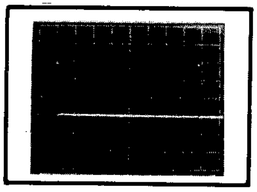
37 0.2V/DIV, 10μs/DIV



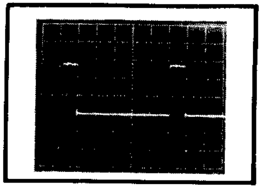
38 2V/DIV, 10μs/DIV



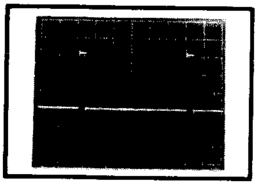
39 2V/DIV, 2ms/DIV



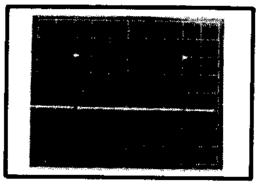
40 2V/DIV, 10μs/DIV



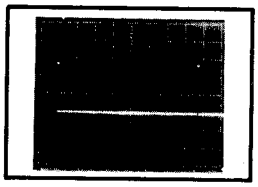
41 2V/DIV, 10μs/DIV



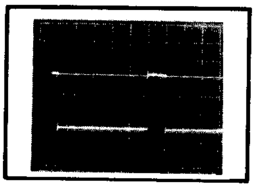
42 2V/DIV, 10μs/DIV



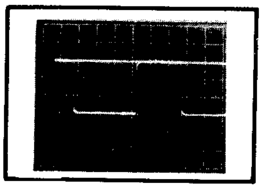
43 2V/DIV, 2ms/DIV



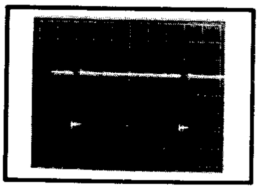
44 2V/DIV, 10μs/DIV



45 2V/DIV, 10μs/DIV

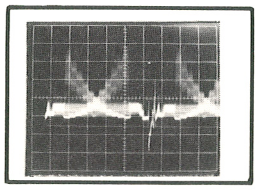


46 2V/DIV, 10μs/DIVV

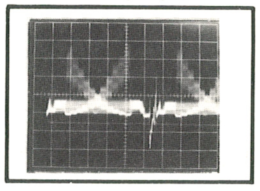


SCHE

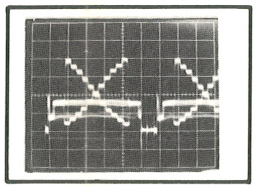
1 0.2V/DIV, 10µs/DIV



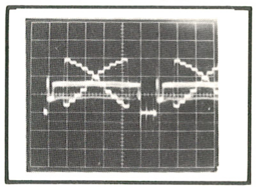
2 0.2V/DIV, 10µs/DIV



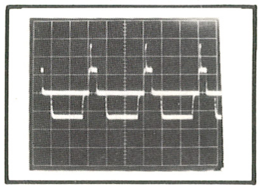
3 0.1V/DIV, 10µs/DIV



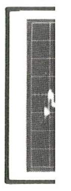
4 0.1V/DIV, 10µs/DIV



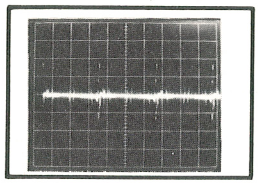
5 1V/DIV, 20µs/DIV



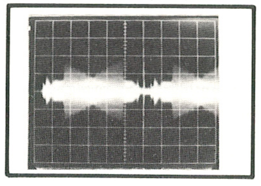
6 0.



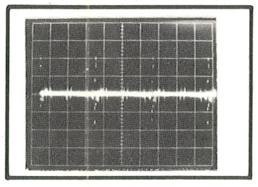
16 0.05V/DIV, 5ms/DIV



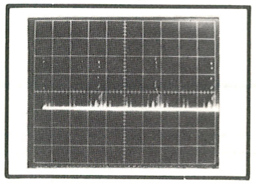
17 0.05V/DIV, 10µs/DIV



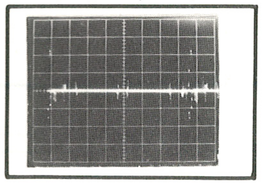
18 0.1V/DIV, 5ms/DIV



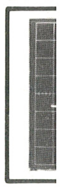
19 0.2V/DIV, 5ms/DIV

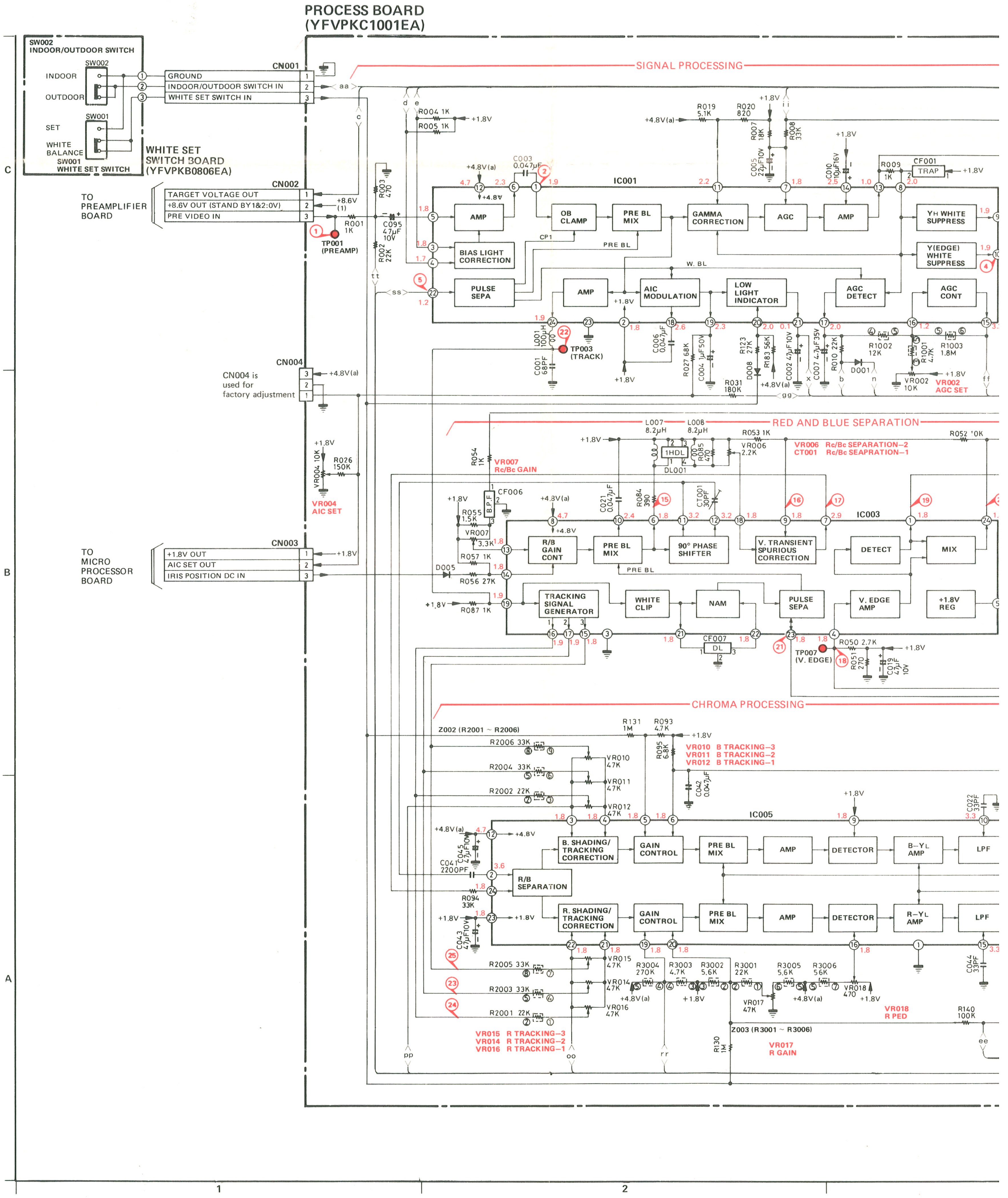


20 0.5V/DIV, 2ms/DIV



21 0



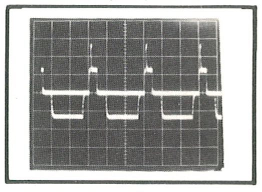


IC001	AN2110S	C2
IC002	AN2210S	C4
IC003	AN2310S	B2, B3
IC004	AN2410S	B4
IC005	AN2320S	A2, A3
IC006	AN2560S	C6
IC008	NJM3414M	A6
IC009	MN6164	A4
IC010	AN6914S	A4
IC011	MN6160PBS	B6
IC012	EHMSB11H44K	B4
IC013	EHMH1115H45S	B6
Q001	2SC2377-CD	C3
Q002	2SD636-QRS	C4
Q003	2SC828-QRS	B4
Q004	2SD601-QRS	B5
Q005	2SC2404-CD	B5
Q006	2SC2404-CD	B5
Q007	2SB643-QRS	B6
Q014	2SC2377-CD	D9
Q015	2SC828-QRS	C6
D001	MA165	C3
D003	MA165	C5
D004	MA165	A3
D005	MA165	B2
D006	MA165	C6
D007	MA165	C6
D008	MA165	C2
D009	MA165	B5
D010	MA165	C6
D011	YUD1S2688	B6
D012	YUD1S2688	B6
D013	MA165	B4
D014	MA165	B4

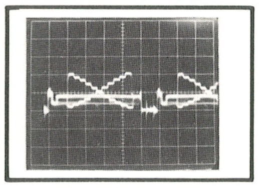
SCHEMATIC DIAGRAM OF PROCESS BOARD (YFVPKC1001EA)

V

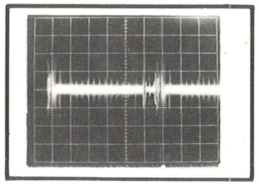
5 1V/DIV, 20µs/DIV



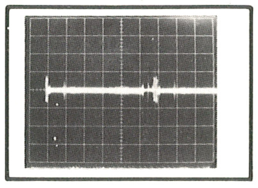
6 0.05V/DIV, 10µs/DIV



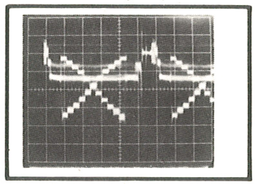
7 0.1V/DIV, 10µs/DIV



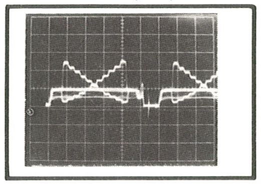
8 0.05V/DIV, 10µs/DIV



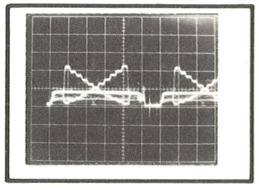
9 0.2V/DIV, 10µs/DIV



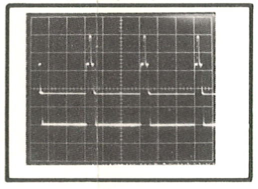
10 0.2V/DIV, 10µs/DIV



11 0.2V/DIV, 10µs/DIV

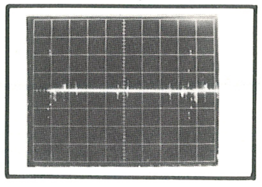


12 1V/DIV, 20µs/DIV

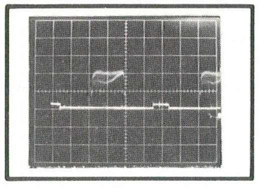


V

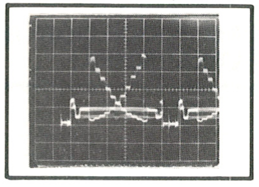
20 0.5V/DIV, 2ms/DIV



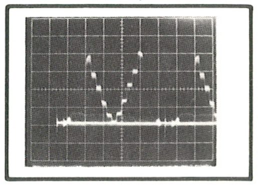
21 0.5V/DIV, 10µs/DIV



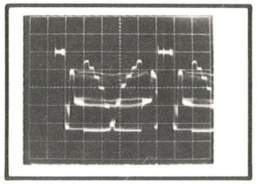
22 0.1V/DIV, 10µs/DIV



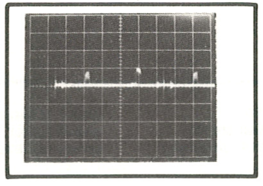
23 0.1V/DIV, 10µs/DIV



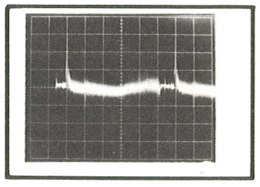
24 0.1V/DIV, 10µs/DIV



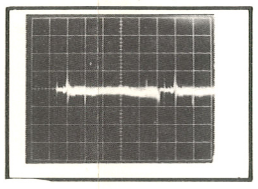
25 0.1V/DIV, 10µs/DIV

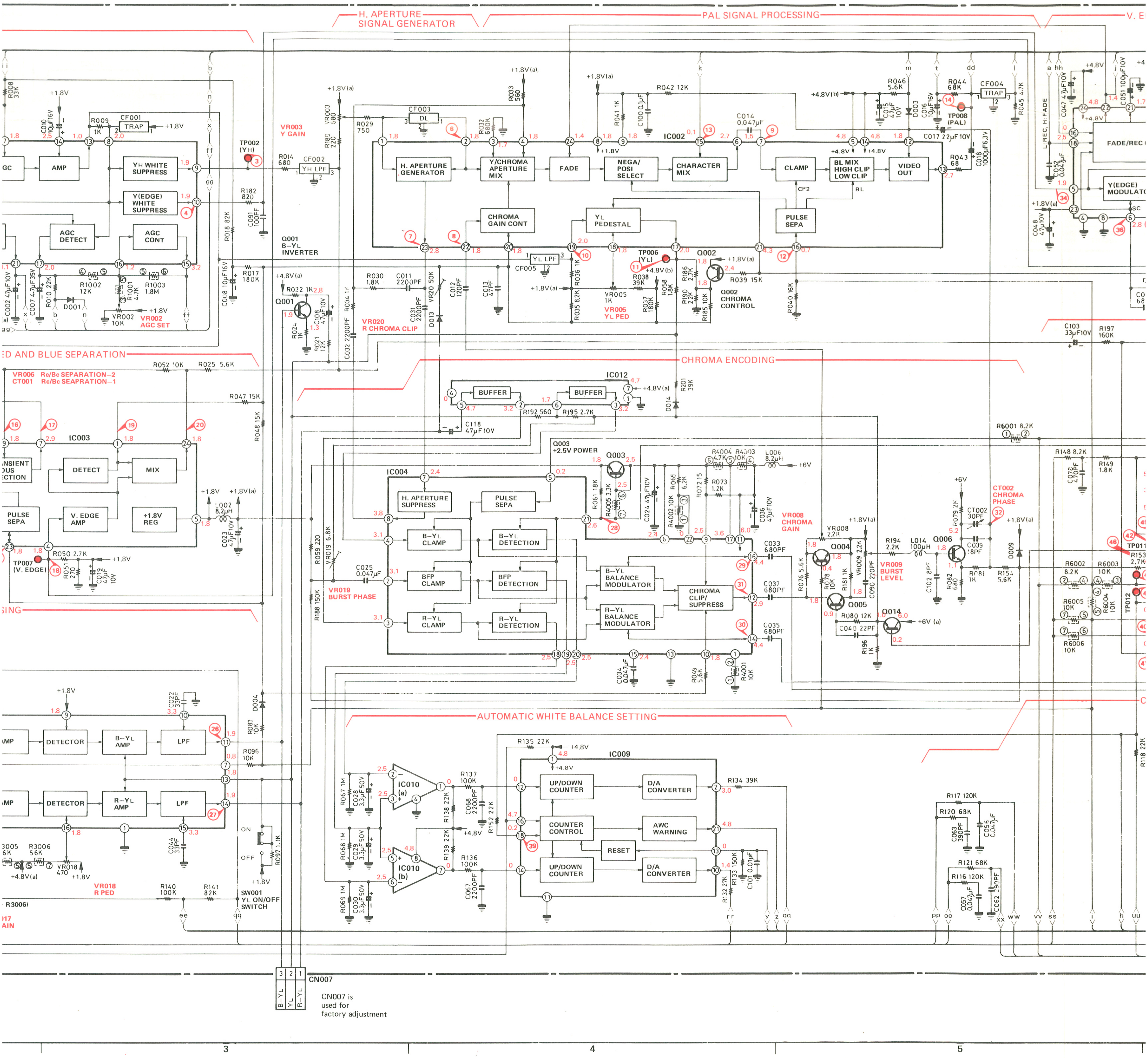


26 0.1V/DIV, 10µs/DIV



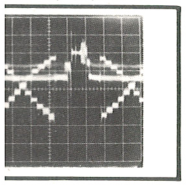
27 0.1V/DIV, 10µs/DIV



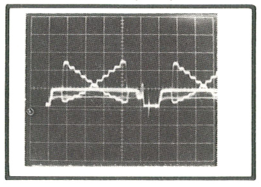


BOARD (YFVPKC1001EA)

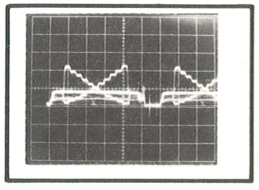
/DIV, 10μs/DIV



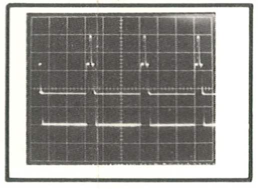
10 0.2V/DIV, 10μs/DIV



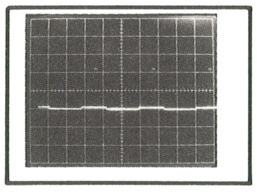
11 0.2V/DIV, 10μs/DIV



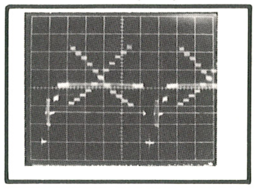
12 1V/DIV, 20μs/DIV



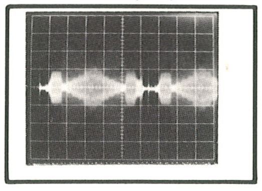
13 0.5V/DIV, 5ms/DIV



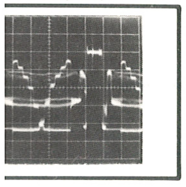
14 0.2V/DIV, 10μs/DIV



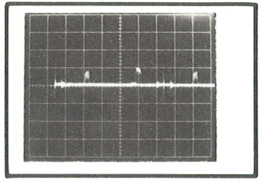
15 0.1V/DIV, 10μs/DIV



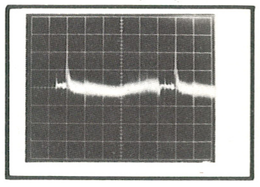
/DIV, 10μs/DIV



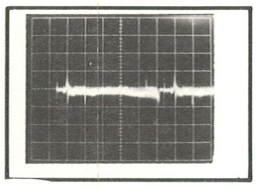
25 0.1V/DIV, 10μs/DIV



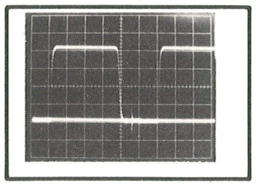
26 0.1V/DIV, 10μs/DIV



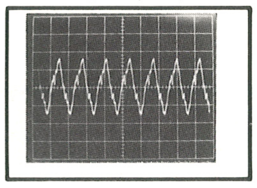
27 0.1V/DIV, 10μs/DIV



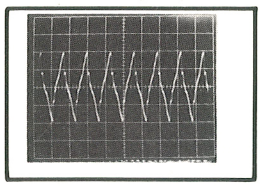
28 0.2V/DIV, 10μs/DIV

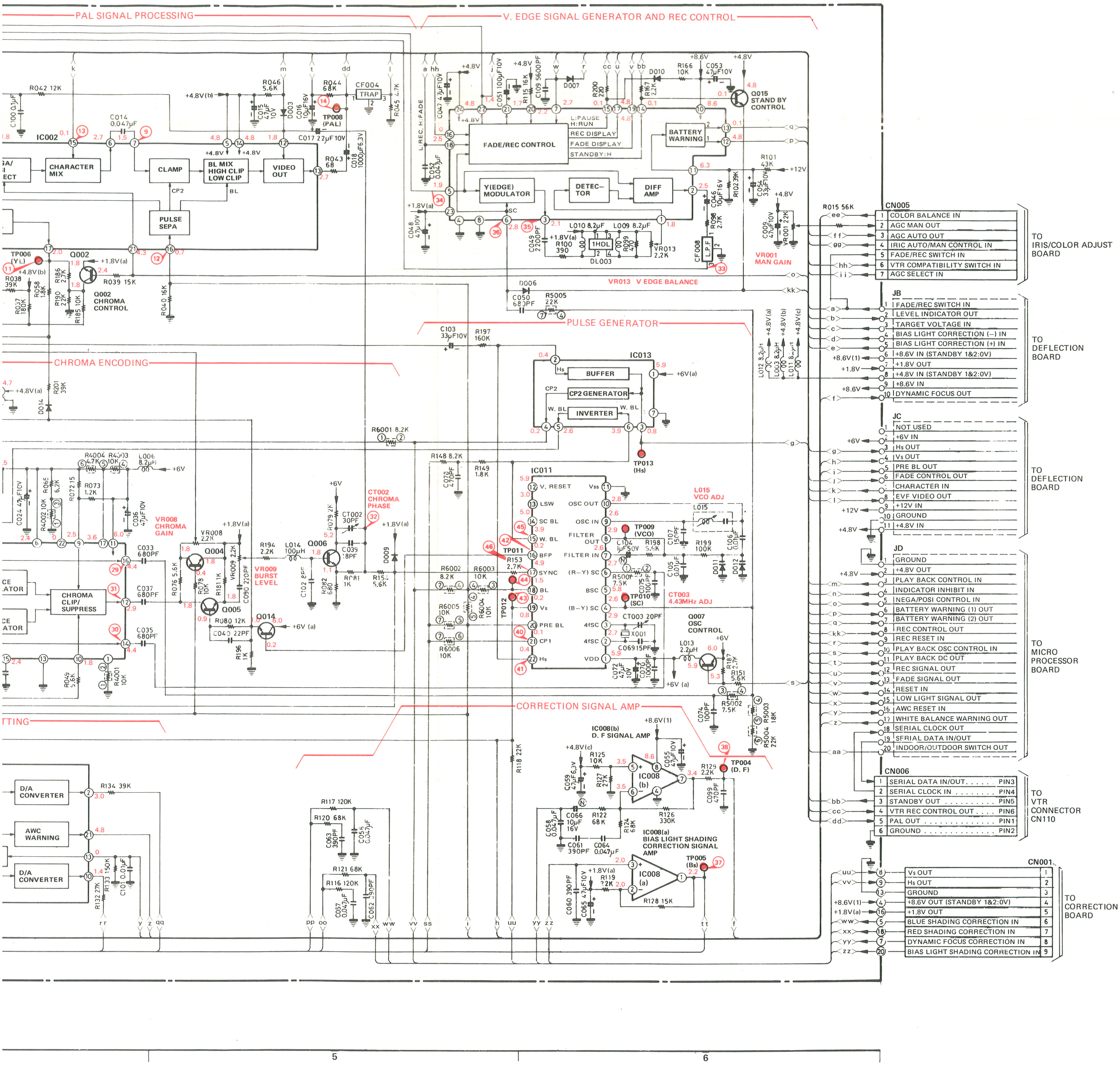


29 0.1V/DIV, 0.2μs/DIV

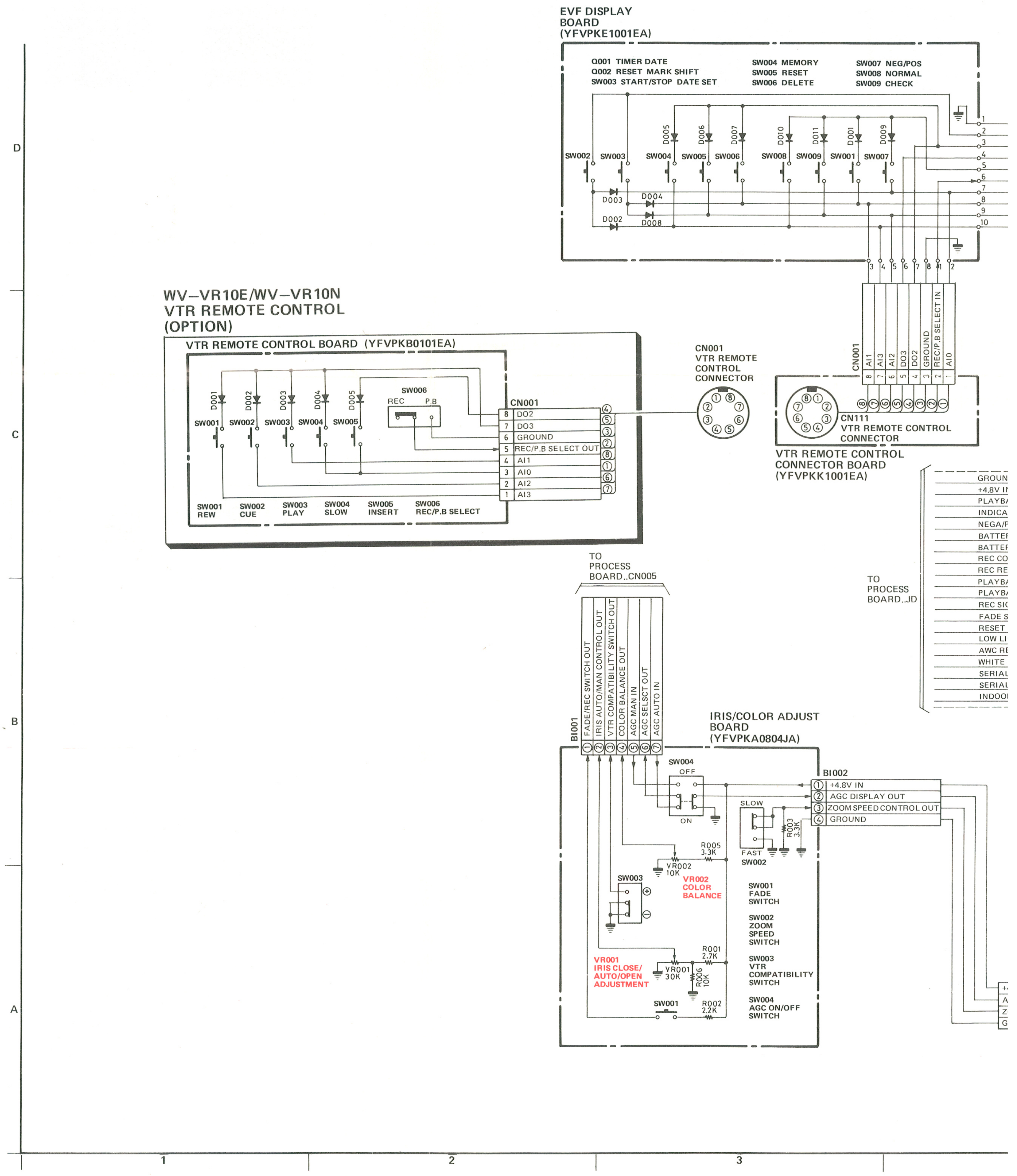


30 0.1V/DIV, 0.2μs/DIV





SCHEMA



EVF DISPLAY BOARD (YFVPKE1001EA)
Q001 TIMER DATE
Q002 RESET MARK SHIFT
SW003 START/STOP DATE SET
SW004 MEMORY
SW005 RESET
SW006 DELETE
SW007 NEG/POS
SW008 NORMAL
SW009 CHECK
SW002
SW003
SW004
SW005
SW006
SW008
SW009
SW001
SW007
D005
D006
D007
D010
D011
D001
D009
D003
D004
D002
D008
WV–VR10E/WV–VR10N
VTR REMOTE CONTROL
(OPTION)
VTR REMOTE CONTROL BOARD (YFVPKB0101EA)
D001
D002
D003
D004
D005
SW006
REC
P.B
SW001
SW002
SW003
SW004
SW005
CN001
8 DO2
7 DO3
6 GROUND
5 REC/P.B SELECT OUT
4 AI1
3 AI0
2 AI2
1 AI3
SW001 REW
SW002 CUE
SW003 PLAY
SW004 SLOW
SW005 INSERT
SW006 REC/P.B SELECT
CN001 VTR REMOTE CONTROL CONNECTOR
CN001
8 AI1
7 AI3
6 AI2
5 DO3
4 DO2
3 GROUND
2 REC/P.B SELECT IN
1 AI0
CN111 VTR REMOTE CONTROL CONNECTOR
VTR REMOTE CONTROL CONNECTOR BOARD (YFVPKK1001EA)
GROUN
+4.8V IN
PLAYBA
INDICA
NEGA/F
BATTER
BATTER
REC CO
REC RE
PLAYBA
PLAYBA
REC SIG
FADE S
RESET
LOW LI
AWC RE
WHITE
SERIAL
SERIAL
INDOO
TO PROCESS BOARD..JD
TO PROCESS BOARD..CN005
BI001
① FADE/REC SWITCH OUT
② IRIS AUTO/MAN CONTROL OUT
③ VTR COMPATIBILITY SWITCH OUT
④ COLOR BALANCE OUT
⑤ AGC MAN IN
⑥ AGC SELSCT OUT
⑦ AGC AUTO IN
IRIS/COLOR ADJUST BOARD (YFVPKA0804JA)
SW004
OFF
ON
BI002
① +4.8V IN
② AGC DISPLAY OUT
③ ZOOM SPEED CONTROL OUT
④ GROUND
SLOW
FAST
SW002
R003 3.3K
R005 3.3K
VR002 10K
VR002 COLOR BALANCE
SW003
R001 2.7K
VR001 30K
R006 10K
VR001 IRIS CLOSE/ AUTO/OPEN ADJUSTMENT
SW001
R002 2.2K
SW001 FADE SWITCH
SW002 ZOOM SPEED SWITCH
SW003 VTR COMPATIBILITY SWITCH
SW004 AGC ON/OFF SWITCH
D
C
B
A
1
2
3

MICRO PROCESSOR BOARD

IC001	NJM3414M	D8, C8
IC002	MN1455AVD2	C6, B6
IC003	MN1227A	D7
IC004	MN1453AVG1	C7, B7
IC005	MN6280	C7
Q001	2SD636-QRS	D8
Q002	2SB641-QRS	D8
Q003	2SD661-TU	B5
Q004	2SD636-QRS	C8
Q005	2SD639-QRS	B5
Q006	2SB641-QRS	B8
Q007	2SB641-QRS	B8
Q008	2SB641-QRS	B8
Q009	2SB641-QRS	B7
Q010	2SB641-QRS	B7
Q011	2SB641-QRS	B6
Q012	2SB641-QRS	B6
Q013	2SB641-QRS	B6
Q014	2SD636-QRS	A7
Q015	2SB641-QRS	B6
Q016	2SB641-QRS	B5
D001	MA165	C5
D002	MA165	C5
D003	MA165	C5
D004	MA165	D5
D005	MA165	B5
D006	MA165	B5
D007	MA165	B5
D008	MA165	B5
D009	MA165	B5
D010	MA165	B5
D011	MA165	C8
D012	MA165	B5
D013	MA165	D5
D015	MA165	D5
D017	MA165	C5

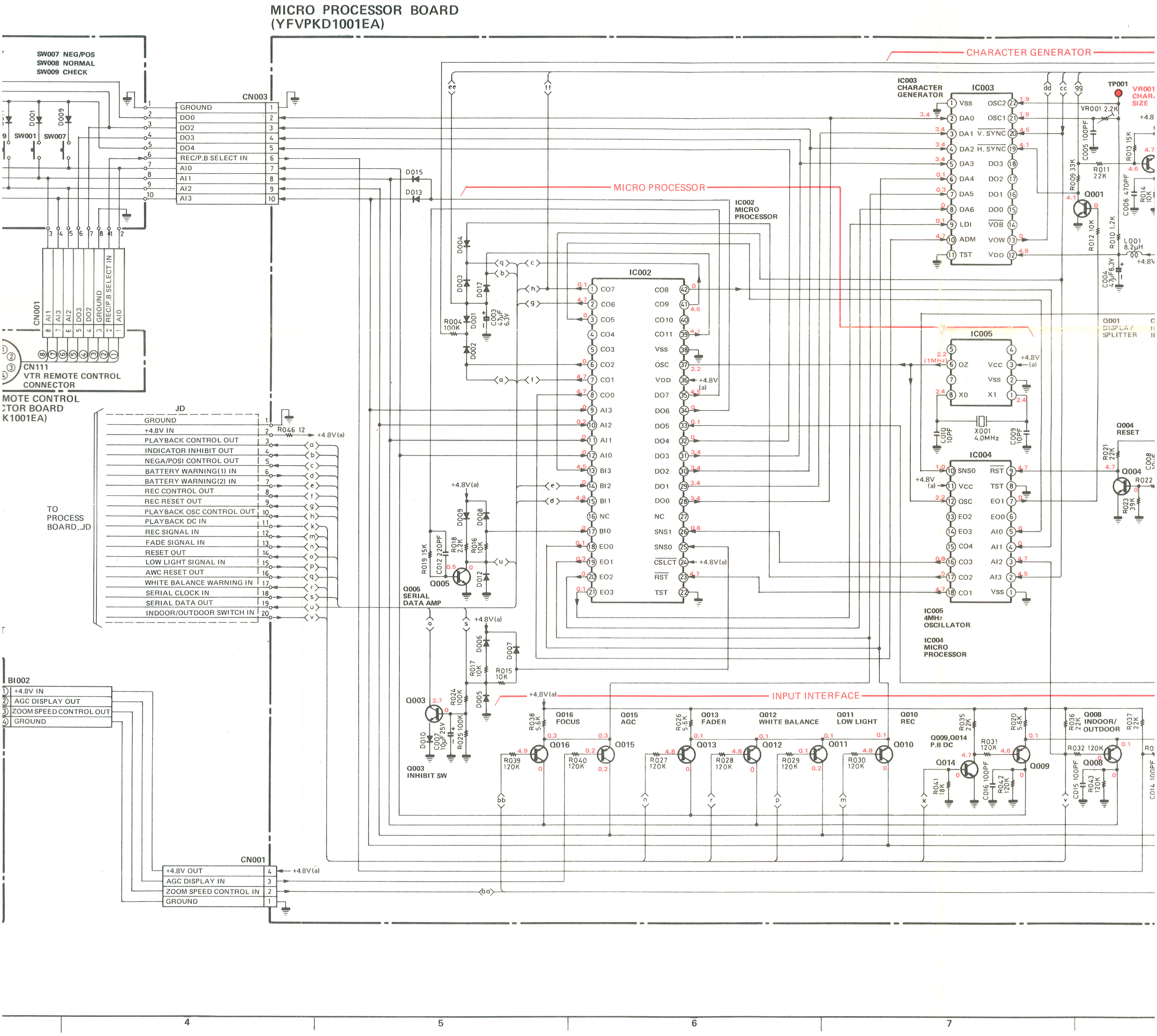
VTR REMOTE CONTROL BOARD

D001	1SS133	C1
D002	1SS133	C1
D003	1SS133	C1
D004	1SS133	C2
D005	1SS133	C2

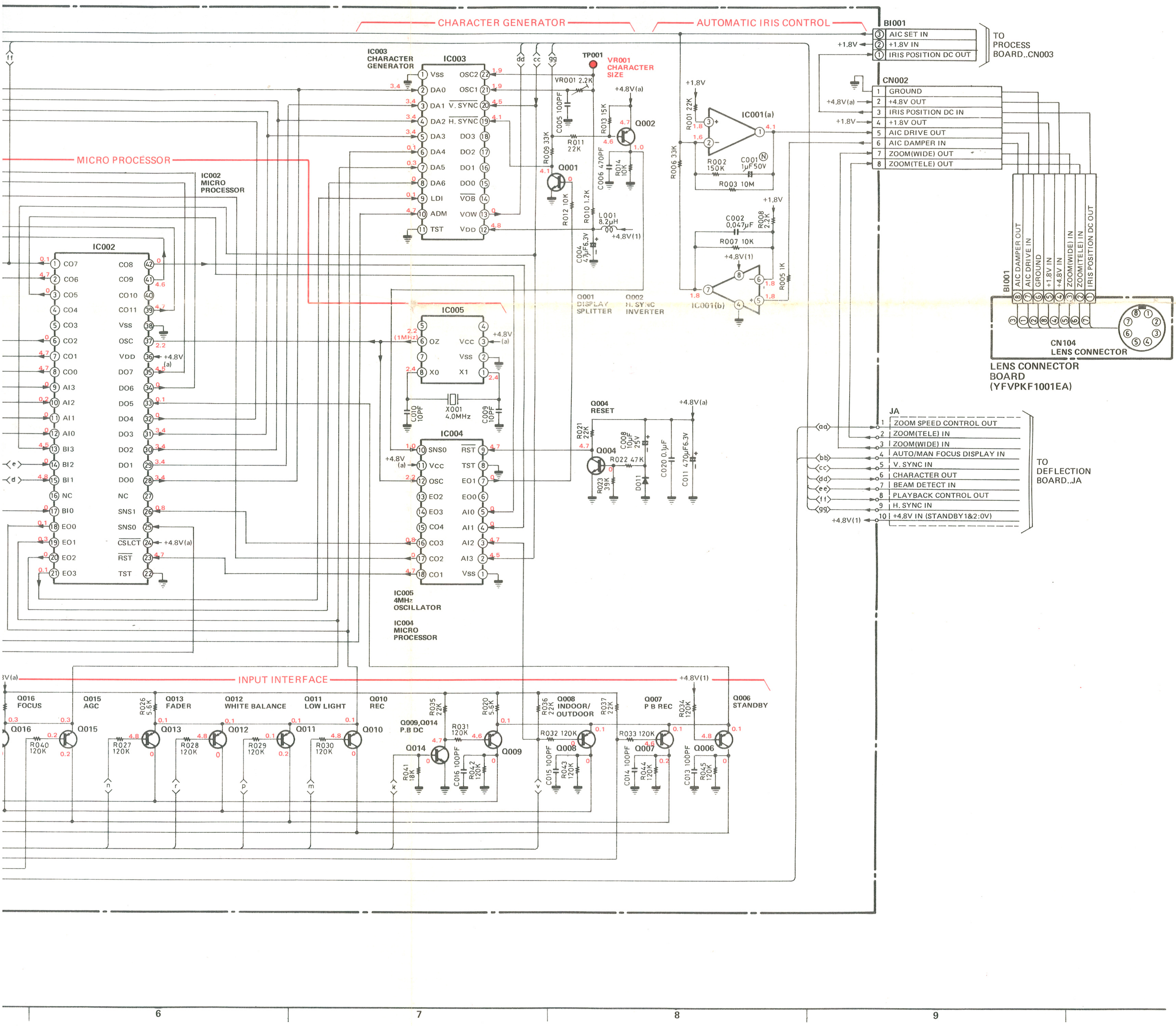
EVF DISPLAY BOARD

D001	1SS133	D3
D002	1SS133	D3
D003	1SS133	D3
D004	1SS133	D3
D005	1SS133	D3
D006	1SS133	D3
D007	1SS133	D3
D008	1SS133	D3
D009	1SS133	D3
D010	1SS133	D3
D011	1SS133	D3

SCHEMATIC DIAGRAM OF MICRO PROCESSOR BOARD (YFVPKD1001EA)

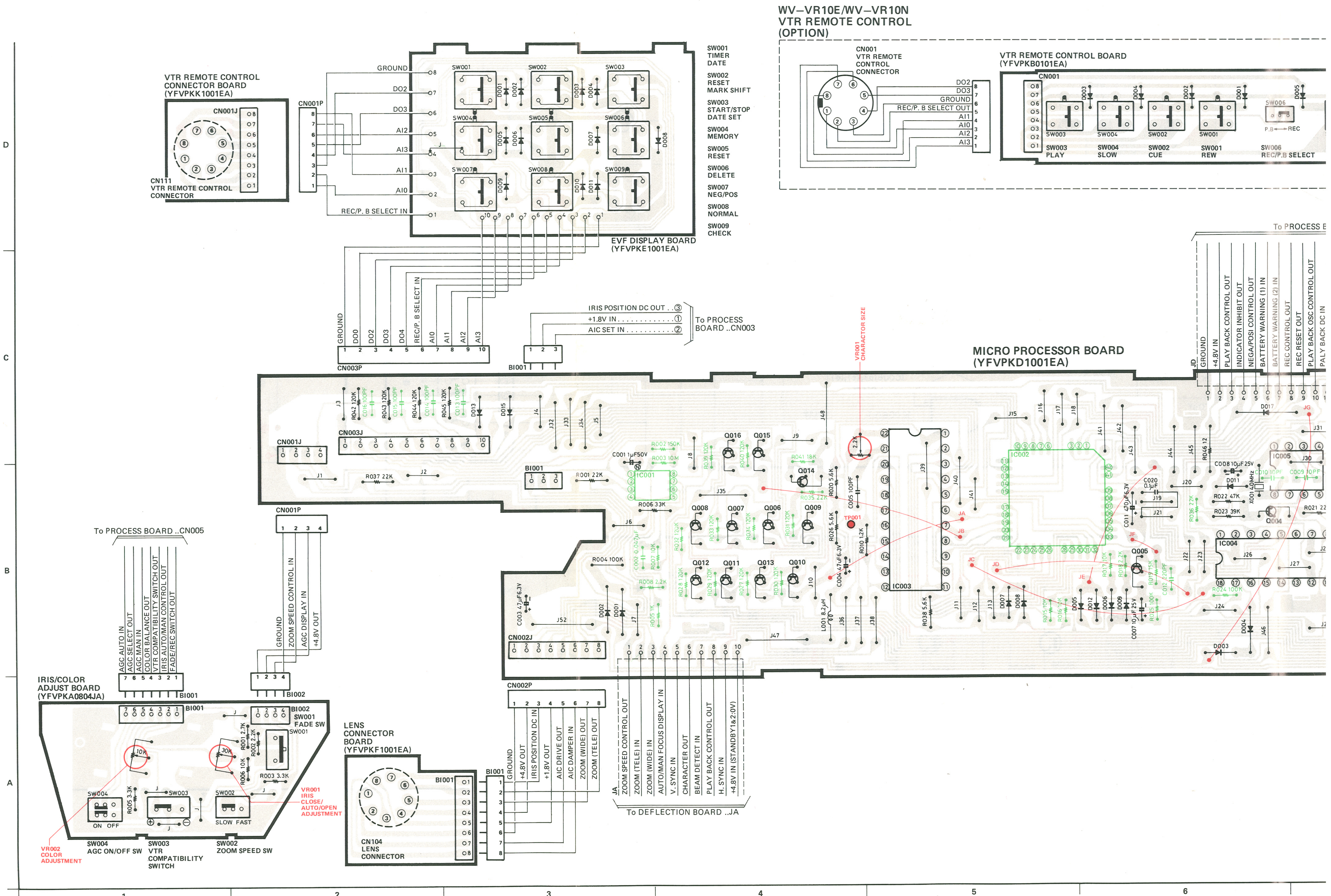

MICRO PROCESSOR BOARD
(YFVPKD1001EA)
SW007 NEG/POS
SW008 NORMAL
SW009 CHECK
SW001
SW007
D001
D009
CN003
GROUND
DO0
DO2
DO3
DO4
REC/P.B SELECT IN
AI0
AI1
AI2
AI3
CN001
CN111
VTR REMOTE CONTROL CONNECTOR
MOTE CONTROL
CTOR BOARD
K1001EA)
JD
GROUND
+4.8V IN
PLAYBACK CONTROL OUT
INDICATOR INHIBIT OUT
NEGA/POSI CONTROL OUT
BATTERY WARNING(1) IN
BATTERY WARNING(2) IN
REC CONTROL OUT
REC RESET OUT
PLAYBACK OSC CONTROL OUT
PLAYBACK DC IN
REC SIGNAL IN
FADE SIGNAL IN
RESET OUT
LOW LIGHT SIGNAL IN
AWC RESET OUT
WHITE BALANCE WARNING IN
SERIAL CLOCK IN
SERIAL DATA OUT
INDOOR/OUTDOOR SWITCH IN
TO PROCESS BOARD..JD
R046 12
+4.8V (a)
BI002
+4.8V IN
AGC DISPLAY OUT
ZOOM SPEED CONTROL OUT
GROUND
CN001
+4.8V OUT
AGC DISPLAY IN
ZOOM SPEED CONTROL IN
GROUND
D015
D013
MICRO PROCESSOR
IC002 MICRO PROCESSOR
IC002
CO7
CO6
CO5
CO4
CO3
CO2
CO1
CO0
AI3
AI2
AI1
AI0
BI3
BI2
BI1
NC
BI0
EO0
EO1
EO2
EO3
CO8
CO9
CO10
CO11
Vss
OSC
VDD
DO7
DO6
DO5
DO4
DO3
DO2
DO1
DO0
NC
SNS1
SNS0
CSLCT
RST
TST
D004
D003
D017
D001
D002
R004 100K
C003 47μF 6.3V
D009
D008
R019 15K
C012 220PF
R018 22K
R016 10K
D012
Q005
Q005 SERIAL DATA AMP
D006
D007
R017 10K
R015 10K
D005
R024 100K
Q003
D010
C007 10μF 25V
R025 100K
Q003 INHIBIT SW
CHARACTER GENERATOR
IC003 CHARACTER GENERATOR
IC003
Vss
DA0
DA1
DA2
DA3
DA4
DA5
DA6
LDI
ADM
TST
OSC2
OSC1
V. SYNC
H. SYNC
DO3
DO2
DO1
DO0
VOB
VOW
VDD
TP001
VR001
CHARA
SIZE
VR001 2.2K
C005 100PF
R009 33K
R011 22K
R013 15K
Q001
C006 470PF
R014 10K
R012 10K
R010 1.2K
L001 8.2μH
C004 47μF 6.3V
Q001 DISPLAY SPLITTER
IC005
OZ
Vcc
Vss
X0
X1
(1MHz)
C010 10PF
X001 4.0MHz
C009 10PF
IC004
SNS0
Vcc
OSC
EO2
EO3
CO4
CO3
CO2
CO1
RST
TST
EO1
EO0
AI0
AI1
AI2
AI3
Vss
IC005 4MHz OSCILLATOR
IC004 MICRO PROCESSOR
Q004 RESET
R021 22K
Q004
R022
R023 39K
C008
INPUT INTERFACE
R038 5.6K
Q016 FOCUS
Q015 AGC
R026 5.6K
Q013 FADER
Q012 WHITE BALANCE
Q011 LOW LIGHT
Q010 REC
R035 22K
R020 5.6K
R036 22K
Q008 INDOOR/OUTDOOR
R037 22K
Q016
Q015
Q013
Q012
Q011
Q010
R039 120K
R040 120K
R027 120K
R028 120K
R029 120K
R030 120K
Q009,Q014 P.B DC
R031 120K
Q014
Q009
R041 18K
C016 100PF
R042 120K
R032 120K
Q008
C015 100PF
R043 120K
C014 100PF
4
5
6
7

ROCESSOR BOARD (YFVPKD1001EA)

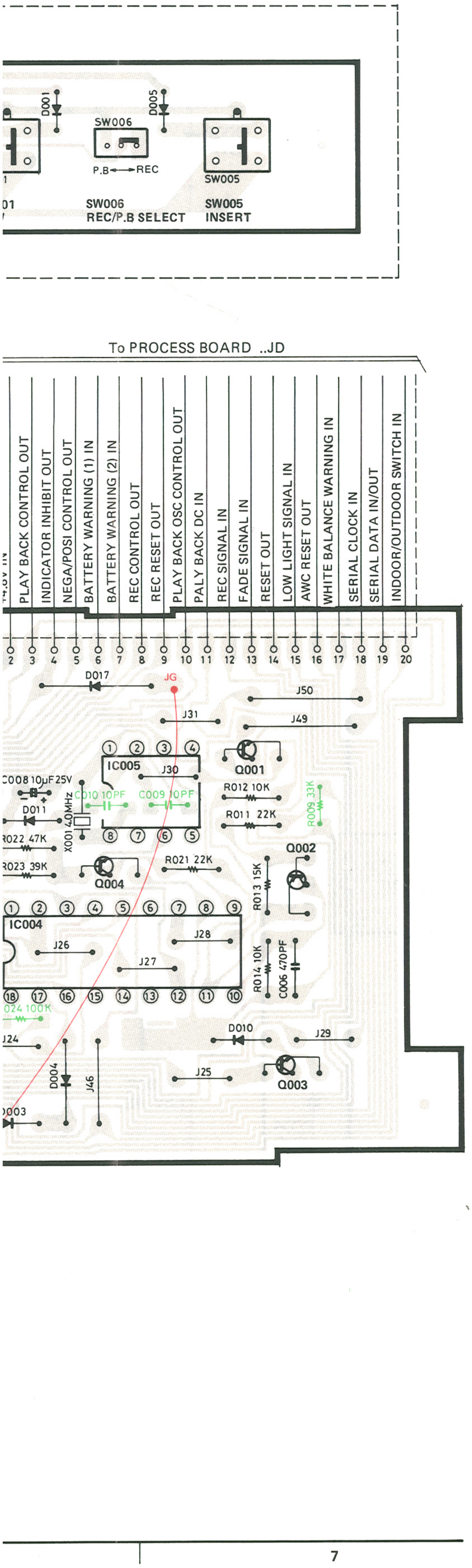


CHARACTER GENERATOR
AUTOMATIC IRIS CONTROL
MICRO PROCESSOR
INPUT INTERFACE
IC003 CHARACTER GENERATOR
IC003
IC002 MICRO PROCESSOR
IC002
IC005
IC004
IC005 4MHz OSCILLATOR
IC004 MICRO PROCESSOR
IC001(a)
IC001(b)
TP001
VR001 CHARACTER SIZE
VR001 2.2K
Q001 DISPLAY SPLITTER
Q002 H. SYNC INVERTER
Q004 RESET
X001 4.0MHz
L001 8.2μH
BI001
AIC SET IN
+1.8V IN
IRIS POSITION DC OUT
TO PROCESS BOARD,,CN003
CN002
GROUND
+4.8V OUT
IRIS POSITION DC IN
+1.8V OUT
AIC DRIVE OUT
AIC DAMPER IN
ZOOM(WIDE) OUT
ZOOM(TELE) OUT
BI001
AIC DAMPER OUT
AIC DRIVE IN
GROUND
+1.8V IN
+4.8V IN
ZOOM(WIDE) IN
ZOOM(TELE) IN
IRIS POSITION DC OUT
CN104 LENS CONNECTOR
LENS CONNECTOR BOARD (YFVPKF1001EA)
JA
ZOOM SPEED CONTROL OUT
ZOOM(TELE) IN
ZOOM(WIDE) IN
AUTO/MAN FOCUS DISPLAY IN
V. SYNC IN
CHARACTER OUT
BEAM DETECT IN
PLAYBACK CONTROL OUT
H. SYNC IN
+4.8V IN (STANDBY1&2:0V)
TO DEFLECTION BOARD,,JA
Q016 FOCUS
Q015 AGC
Q013 FADER
Q012 WHITE BALANCE
Q011 LOW LIGHT
Q010 REC
Q009,Q014 P.B DC
Q008 INDOOR/OUTDOOR
Q007 P B REC
Q006 STANDBY
6
7
8
9

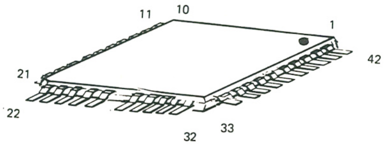
CONDUCTOR VIEW OF MICRO PROCESSOR BOARD (YFVPKD1001EA)


WV–VR10E/WV–VR10N
VTR REMOTE CONTROL
(OPTION)
CN001
VTR REMOTE
CONTROL
CONNECTOR
VTR REMOTE CONTROL BOARD
(YFVPKB0101EA)
DO2
DO3
GROUND
REC/P. B SELECT OUT
AI1
AI0
AI2
AI3
SW003
PLAY
SW004
SLOW
SW002
CUE
SW001
REW
SW006
REC/P.B SELECT
P.B ←→ REC
VTR REMOTE CONTROL
CONNECTOR BOARD
(YFVPKK1001EA)
CN001J
CN111
VTR REMOTE CONTROL
CONNECTOR
CN001P
GROUND
DO2
DO3
AI2
AI3
AI1
AI0
REC/P. B SELECT IN
SW001
TIMER
DATE
SW002
RESET
MARK SHIFT
SW003
START/STOP
DATE SET
SW004
MEMORY
SW005
RESET
SW006
DELETE
SW007
NEG/POS
SW008
NORMAL
SW009
CHECK
EVF DISPLAY BOARD
(YFVPKE1001EA)
GROUND
DO0
DO2
DO3
DO4
REC/P. B SELECT IN
AI0
AI1
AI2
AI3
CN003P
IRIS POSITION DC OUT . . ③
+1.8V IN . . . . ①
AIC SET IN . . . . ②
To PROCESS
BOARD ..CN003
BI001
VR001
CHARACTOR SIZE
MICRO PROCESSOR BOARD
(YFVPKD1001EA)
To PROCESS B
GROUND
+4.8V IN
PLAY BACK CONTROL OUT
INDICATOR INHIBIT OUT
NEGA/POSI CONTROL OUT
BATTERY WARNING (1) IN
BATTERY WARNING (2) IN
REC CONTROL OUT
REC RESET OUT
PLAY BACK OSC CONTROL OUT
PALY BACK DC IN
CN001J
CN003J
BI001
IC001
IC002
IC003
IC004
IC005
Q004
Q005
Q006
Q007
Q008
Q009
Q010
Q011
Q012
Q013
Q014
Q015
Q016
TP001
X001 4.0MHz
CN002J
CN001P
To PROCESS BOARD ..CN005
AGC AUTO IN
AGC SELECT OUT
AGC MAN IN
COLOR BALANCE OUT
VTR COMPATIBILITY SWITCH OUT
IRIS AUTO/MAN CONTROL OUT
FADE/REC SWITCH OUT
GROUND
ZOOM SPEED CONTROL IN
AGC DISPLAY IN
+4.8V OUT
IRIS/COLOR
ADJUST BOARD
(YFVPKA0804JA)
BI001
BI002
SW001
FADE SW
VR002
COLOR
ADJUSTMENT
VR001
IRIS
CLOSE/
AUTO/OPEN
ADJUSTMENT
SW004
AGC ON/OFF SW
ON OFF
SW003
VTR
COMPATIBILITY
SWITCH
SW002
ZOOM SPEED SW
SLOW FAST
LENS
CONNECTOR
BOARD
(YFVPKF1001EA)
CN104
LENS
CONNECTOR
BI001
CN002P
GROUND
+4.8V OUT
IRIS POSITION DC IN
+1.8V OUT
AIC DRIVE OUT
AIC DAMPER IN
ZOOM (WIDE) OUT
ZOOM (TELE) OUT
JA
ZOOM SPEED CONTROL OUT
ZOOM (TELE) IN
ZOOM (WIDE) IN
AUTO/MAN FOCUS DISPLAY IN
V. SYNC IN
CHARACTER OUT
BEAM DETECT IN
PLAY BACK CONTROL OUT
H. SYNC IN
+4.8V IN (STANDBY1&2:0V)
To DEFLECTION BOARD ..JA
D
C
B
A
1
2
3
4
5
6

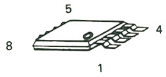
1EA)


D001
D005
SW006
P.B ←→ REC
SW005
SW006 REC/P.B SELECT
SW005 INSERT
To PROCESS BOARD ..JD
PLAY BACK CONTROL OUT
INDICATOR INHIBIT OUT
NEGA/POSI CONTROL OUT
BATTERY WARNING (1) IN
BATTERY WARNING (2) IN
REC CONTROL OUT
REC RESET OUT
PLAY BACK OSC CONTROL OUT
PALY BACK DC IN
REC SIGNAL IN
FADE SIGNAL IN
RESET OUT
LOW LIGHT SIGNAL IN
AWC RESET OUT
WHITE BALANCE WARNING IN
SERIAL CLOCK IN
SERIAL DATA IN/OUT
INDOOR/OUTDOOR SWITCH IN
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
D017
JG
J50
J31
J49
IC005
J30
Q001
C008 10µF 25V
D011
C010 10PF
C009 10PF
X001 4.0MHz
R012 10K
R011 22K
R009 33K
R022 47K
R023 39K
Q004
R021 22K
Q002
R013 15K
IC004
J26
J27
J28
R014 10K
C006 470PF
R024 100K
J24
D004
J46
D010
J29
J25
Q003
D003
7

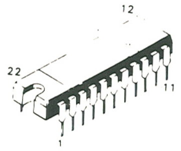
MN1455AVD2


11
10
1
42
21
22
32
33

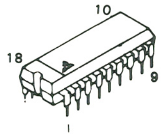
NJM3414M



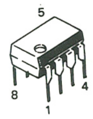
MN1227A



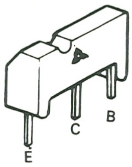
MN1453AVG1



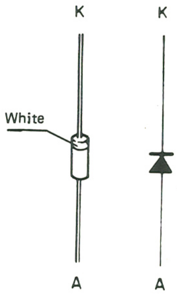
MN6280



2SB641-QRS
2SD636-QRS
2SD661-TU
2SD639-QRS



1SS133
MA165



MICRO PROCESSOR BOARD

IC001	NJM3414M	B3
IC002	MN1455AVD2	B5
IC003	MN1227A	B5
IC004	MN1453AVG1	B6
IC005	MN6280	B7
Q001	2SD636-QRS	C7
Q002	2SB641-QRS	B7
Q003	2SD661-TU	B7
Q004	2SD636-QRS	B6
Q005	2SD639-QRS	B6
Q006	2SB641-QRS	B4
Q007	2SB641-QRS	B4
Q008	2SB641-QRS	B4
Q009	2SB641-QRS	B4
Q010	2SB641-QRS	B4
Q011	2SB641-QRS	B4
Q012	2SB641-QRS	B4
Q013	2SB641-QRS	B4
Q014	2SD636-QRS	B4
Q015	2SB641-QRS	C4
Q016	2SB641-QRS	C4
D001	MA165	B3
D002	MA165	B3
D003	MA165	B6
D004	MA165	B6
D005	MA165	B6
D006	MA165	B6
D007	MA165	B5
D008	MA165	B5
D009	MA165	B6
D010	MA165	B7
D011	MA165	B6
D012	MA165	B6
D013	MA165	C3
D015	MA165	C3
D017	MA165	C6

VTR REMOTE CONTROL BOARD

D001	1SS133	D6
D002	1SS133	D6
D003	1SS133	D5
D004	1SS133	D5
D005	1SS133	D6

EVF DISPLAY BOARD

D001	1SS133	D3
D002	1SS133	D3
D003	1SS133	D3
D004	1SS133	D3
D005	1SS133	D3
D006	1SS133	D3
D007	1SS133	D3
D008	1SS133	D4
D009	1SS133	D3
D010	1SS133	D3
D011	1SS133	D3

SCHEMATIC DIAGRAM OF AUTO FOCUS BOARD (YFES950—24A, YFES950—24B, YFES950—24C, YFES950—24D)

AUTO FOCUS BOARD-A

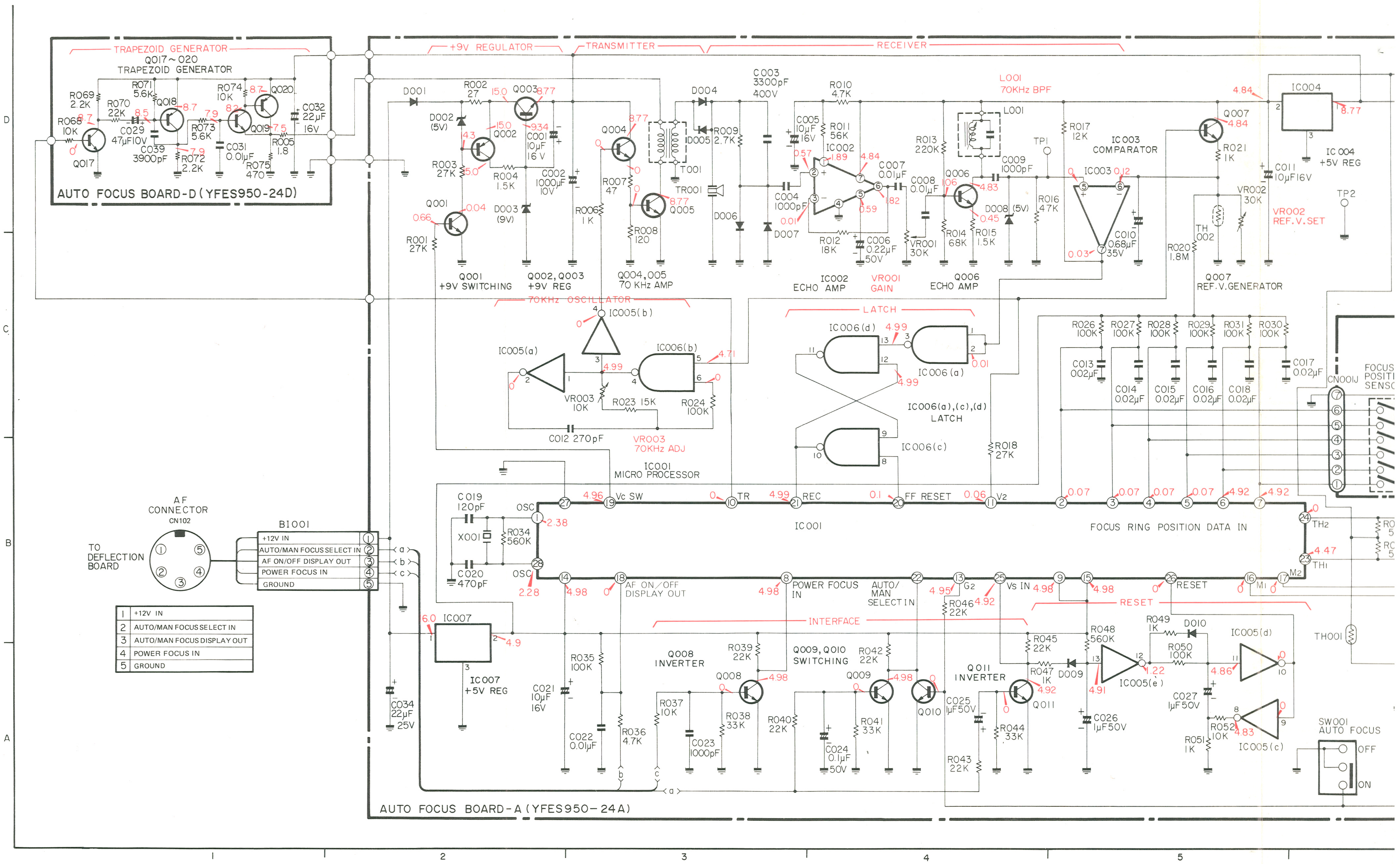
IC001	YFSS514-49	B3, B4, B5
IC002	TA7120P	D4
IC003	AN6914	D5
IC004	NJM78L05A	D6
IC005	UPD4069UBC	C2, C3, A5
IC006	UPD4011BC	C3, C4
IC007	NJM78L05A	B2, A2
Q001	2SC2603 (or 2SC2458)	D2
Q002	2SA1115 (or 2SA1048)	D2
Q003	2SD966	D2
Q004	2SC1317	D3
Q005	2SD966	D3
Q006	2SC2603 (or 2SC2458)	D4
Q007	2SC2603	D5
Q008	2SC2603	A3
Q009	2SC2603	A4
Q010	2SC2603 (or 2SC2458)	A4
Q011	2SC2603	A4
D001	YWRA-1Z	D2
D002	MA1047	D2
D003	MA1091	D2
D004	YWRA-1Z	D3
D005	YWRA-1Z	D3
D006	YWRA-1Z	D3
D007	YWRA-1Z	D3
D008	MA1047	D4
D009	MA150	A5
D010	MA150	B5

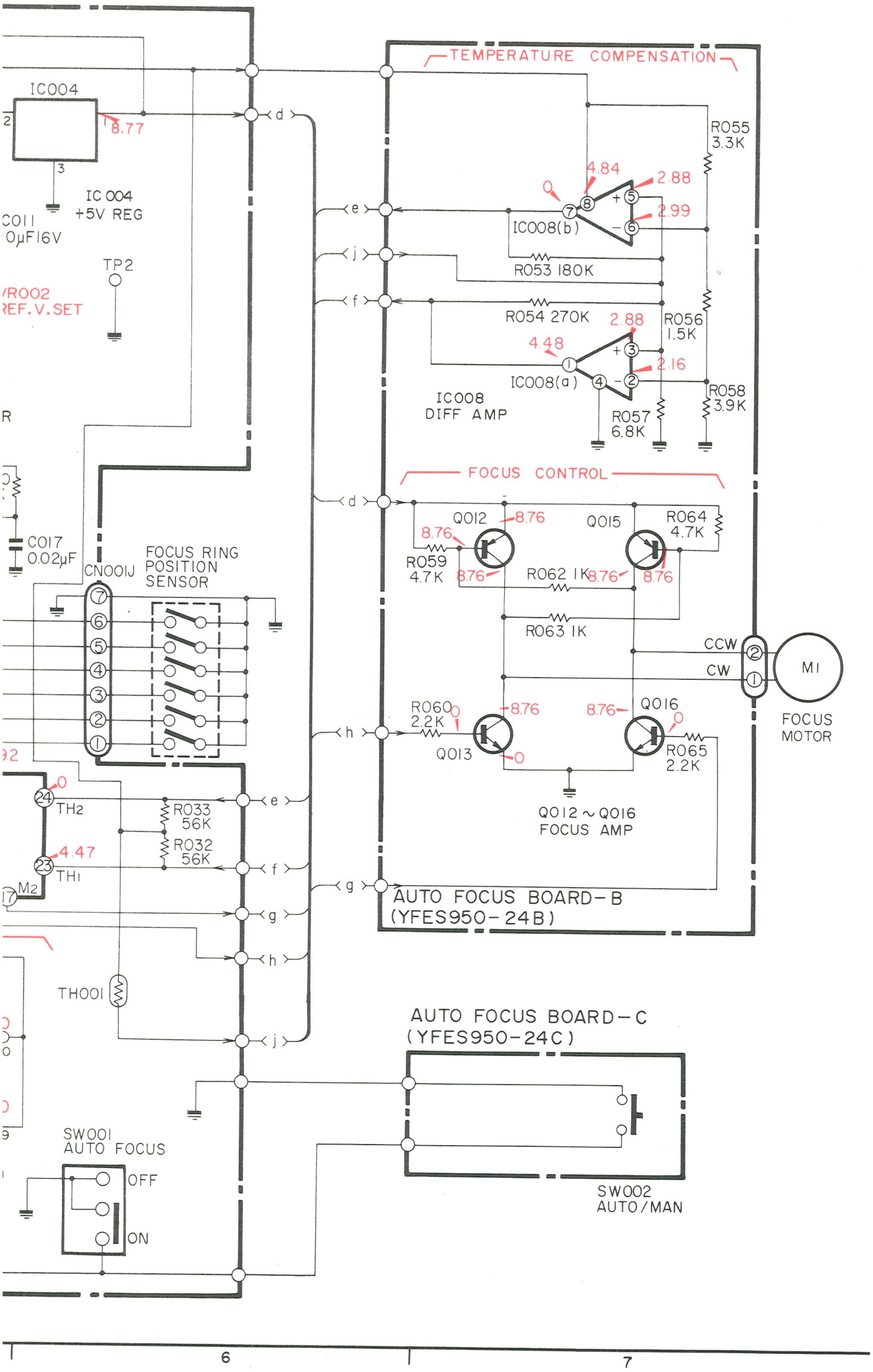
AUTO FOCUS BOARD-B

IC008	AN6914	D7, C7
Q012	2SA720-QR	C7
Q013	2SD965-QR	B7
Q015	2SA720-QR	C7
Q016	2SD965-QR	B7

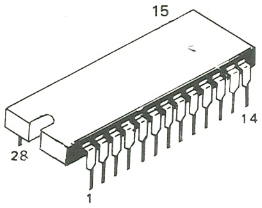
AUTO FOCUS BOARD-D

Q017	2SC2458	D1
Q018	2SA1048	D1
Q019	2SC2458	D1
Q020	2SB873	D1

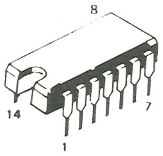

TRAPEZOID GENERATOR
Q017～020
TRAPEZOID GENERATOR
AUTO FOCUS BOARD-D (YFES950-24D)
+9V REGULATOR
TRANSMITTER
RECEIVER
Q001
+9V SWITCHING
Q002, Q003
+9V REG
Q004, 005
70 KHz AMP
TR001
IC002
ECHO AMP
VR001
GAIN
Q006
ECHO AMP
L001
70KHz BPF
IC003
COMPARATOR
Q007
REF.V.GENERATOR
VR002
REF.V.SET
IC004
+5V REG
TP1
TP2
70KHz OSCILLATOR
IC005(b)
IC005(a)
IC006(b)
VR003
70KHz ADJ
LATCH
IC006(d)
IC006(a)
IC006(c)
IC006(a),(c),(d)
LATCH
IC001
MICRO PROCESSOR
Vc SW
TR
REC
FF RESET
V2
FOCUS RING POSITION DATA IN
OSC
AF ON/OFF DISPLAY OUT
POWER FOCUS IN
AUTO/MAN SELECT IN
Vs IN
RESET
TH2
TH1
M2
M1
CN001J
FOCUS POSITI SENSO
AF CONNECTOR
CN102
TO DEFLECTION BOARD
B1001
+12V IN
AUTO/MAN FOCUS SELECT IN
AF ON/OFF DISPLAY OUT
POWER FOCUS IN
GROUND
1 +12V IN
2 AUTO/MAN FOCUS SELECT IN
3 AUTO/MAN FOCUS DISPLAY OUT
4 POWER FOCUS IN
5 GROUND
IC007
+5V REG
INTERFACE
Q008
INVERTER
Q009, Q010
SWITCHING
Q011
INVERTER
IC005(e)
IC005(d)
IC005(c)
TH001
SW001
AUTO FOCUS
OFF
ON
AUTO FOCUS BOARD-A (YFES950-24A)
D
C
B
A
1
2
3
4
5


IC004
8.77
IC 004
+5V REG
C011
10μF16V
TP2
VR002
REF.V.SET
C017
0.02μF
CN001J
FOCUS RING
POSITION
SENSOR
TH2
TH1
M2
R033
56K
R032
56K
4.47
TH001
SW001
AUTO FOCUS
OFF
ON
TEMPERATURE COMPENSATION
R055
3.3K
4.84
2.88
2.99
IC008(b)
R053 180K
R054 270K
2.88
4.48
R056
1.5K
2.16
IC008(a)
IC008
DIFF AMP
R057
6.8K
R058
3.9K
FOCUS CONTROL
Q012
8.76
Q015
R064
4.7K
R059
4.7K
R062 1K
R063 1K
CCW
CW
M1
FOCUS
MOTOR
R060
2.2K
Q013
Q016
R065
2.2K
Q012～Q016
FOCUS AMP
AUTO FOCUS BOARD－B
(YFES950－24B)
AUTO FOCUS BOARD－C
(YFES950－24C)
SW002
AUTO/MAN
6
7

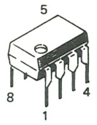
YFSS514-49



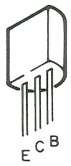
UPD4069UBC
UPD4011BC



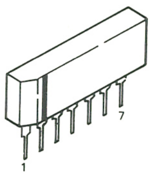
AN6914



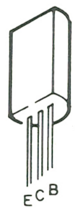
2SA720-QR
2SC1317
2SD965-QR
2SC2603
2SC2458
2SA1115
2SA1048



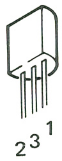
TA7120P



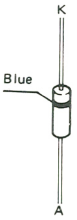
2SD966
2SB873



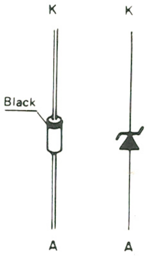
NJM78L05A



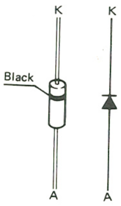
YWRA-1Z



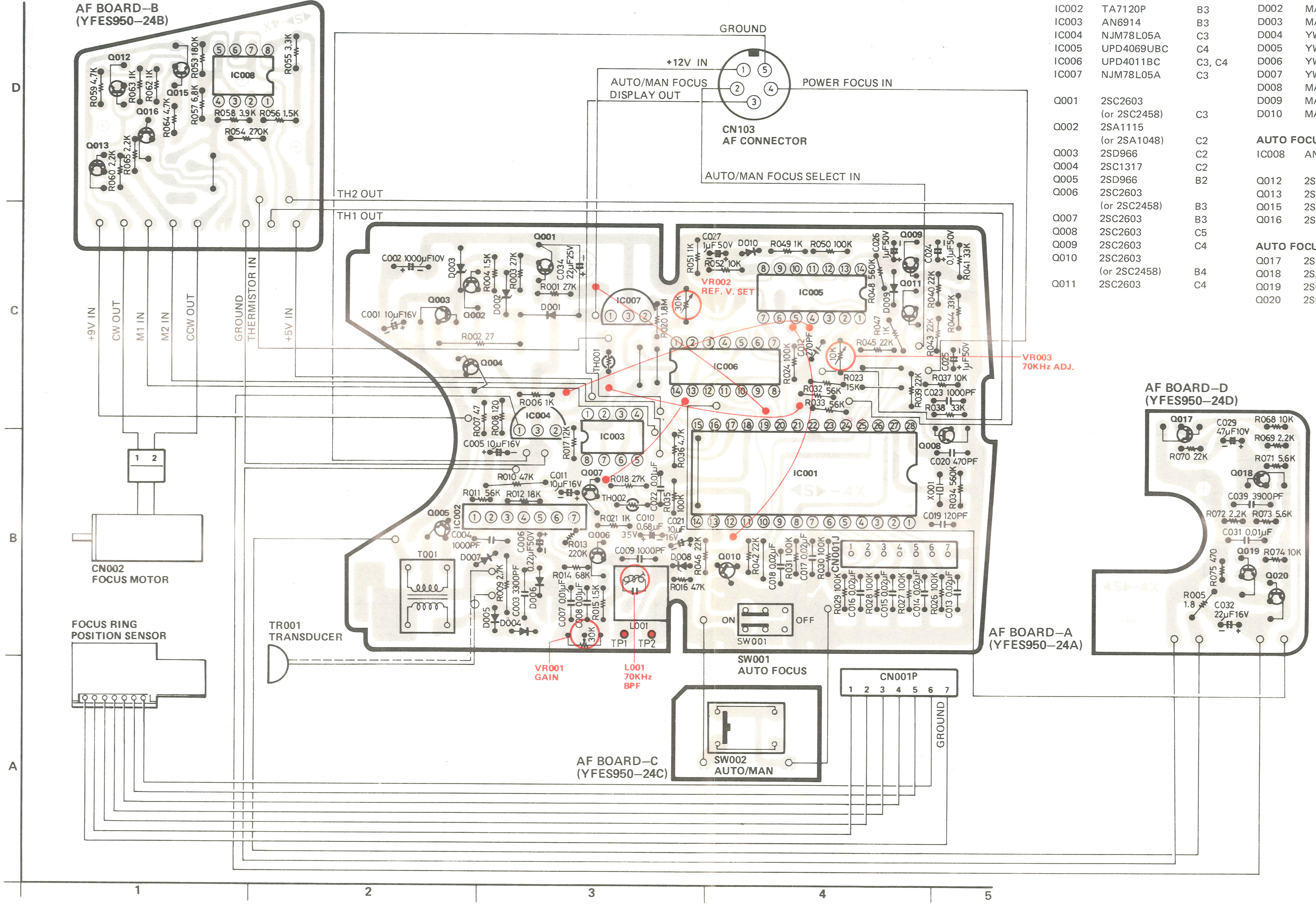
MA1047
MA1091



MA150



CONDUCTOR VIEW OF AUTO FOCUS BOARD (YFES950–24A, YFES950–24B, YFES950–24C, YFES950–24D)


AF BOARD–B
(YFES950–24B)
IC008
Q012
Q013
Q015
Q016
R059 4.7K
R063 1K
R062 1K
R053 180K
R055 3.3K
R057 6.8K
R064 4.7K
R058 3.9K
R056 1.5K
R054 270K
R065 2.2K
R060 2.2K
GROUND
+12V IN
AUTO/MAN FOCUS
DISPLAY OUT
POWER FOCUS IN
CN103
AF CONNECTOR
AUTO/MAN FOCUS SELECT IN
TH2 OUT
TH1 OUT
+9V IN
CW OUT
M1 IN
M2 IN
CCW OUT
GROUND
THERMISTOR IN
+5V IN
CN002
FOCUS MOTOR
FOCUS RING
POSITION SENSOR
TR001
TRANSDUCER
IC001
IC003
IC004
IC005
IC006
IC007
Q001
Q002
Q003
Q004
Q005
Q006
Q007
Q008
Q009
Q010
Q011
VR002
REF. V. SET
VR003
70KHz ADJ.
VR001
GAIN
L001
70KHz
BPF
TP1
TP2
T001
TH001
TH002
X001
SW001
ON
OFF
SW001
AUTO FOCUS
AF BOARD–A
(YFES950–24A)
AF BOARD–C
(YFES950–24C)
SW002
AUTO/MAN
CN001P
GROUND
AF BOARD–D
(YFES950–24D)
Q017
Q018
Q019
Q020
R068 10K
C029 47μF10V
R069 2.2K
R070 22K
R071 5.6K
C039 3900PF
R072 2.2K
R073 5.6K
C031 0.01μF
R074 10K
R075 470
R005 1.8
C032 22μF16V
D
C
B
A
1
2
3
4
5

AUTO FOCUS BOARD-A

IC001	YFSS514-49	B4	D001	YWRA-1Z	C3
IC002	TA7120P	B3	D002	MA1047	C3
IC003	AN6914	B3	D003	MA1091	C2
IC004	NJM78L05A	C3	D004	YWRA-1Z	B3
IC005	UPD4069UBC	C4	D005	YWRA-1Z	B3
IC006	UPD4011BC	C3, C4	D006	YWRA-1Z	B3
IC007	NJM78L05A	C3	D007	YWRA-1Z	B3
			D008	MA1047	B3
Q001	2SC2603		D009	MA150	C4
	(or 2SC2458)	C3	D010	MA150	C4
Q002	2SA1115				
	(or 2SA1048)	C2			
Q003	2SD966	C2			
Q004	2SC1317	C2			
Q005	2SD966	B2			
Q006	2SC2603				
	(or 2SC2458)	B3			
Q007	2SC2603	B3			
Q008	2SC2603	C5			
Q009	2SC2603	C4			
Q010	2SC2603				
	(or 2SC2458)	B4			
Q011	2SC2603	C4			

AUTO FOCUS BOARD-B

IC008	AN6914	D1
Q012	2SA720-QR	D1
Q013	2SD965-QR	D1
Q015	2SA720-QR	D1
Q016	2SD965-QR	D1

AUTO FOCUS BOARD-D

Q017	2SC2458	C6
Q018	2SA1048	B6
Q019	2SC2458	B6
Q020	2SB873	B6

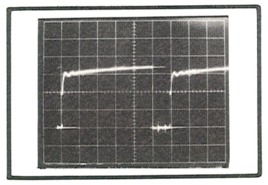
SCHEMATIC DIAGRAM OF ELECTRONIC VIEWFINDER BOARD (YFVPKA0803JA)

Q001	2SD975	D3
Q002	2SB642-QRS	B4
Q003	2SA564-QRS	C3
D001	MA165	C3
D002	MA162	C4
D003	ES01F	D4

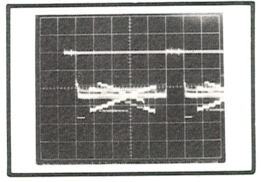
PRODUCT SAFETY NOTE

The shaded area on this schematic incorporates special features important for protection from X-radiation, fire and electrical shock hazards.
When servicing, it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

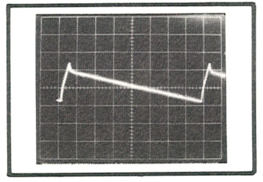
1 0.5V/DIV, 10µs/DIV



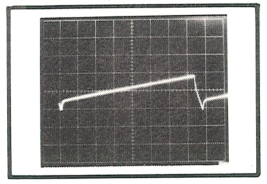
2 1V/DIV, 10µs/DIV



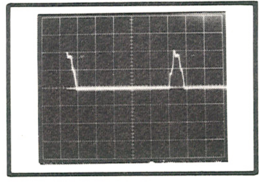
3 1V/DIV, 2ms/DIV

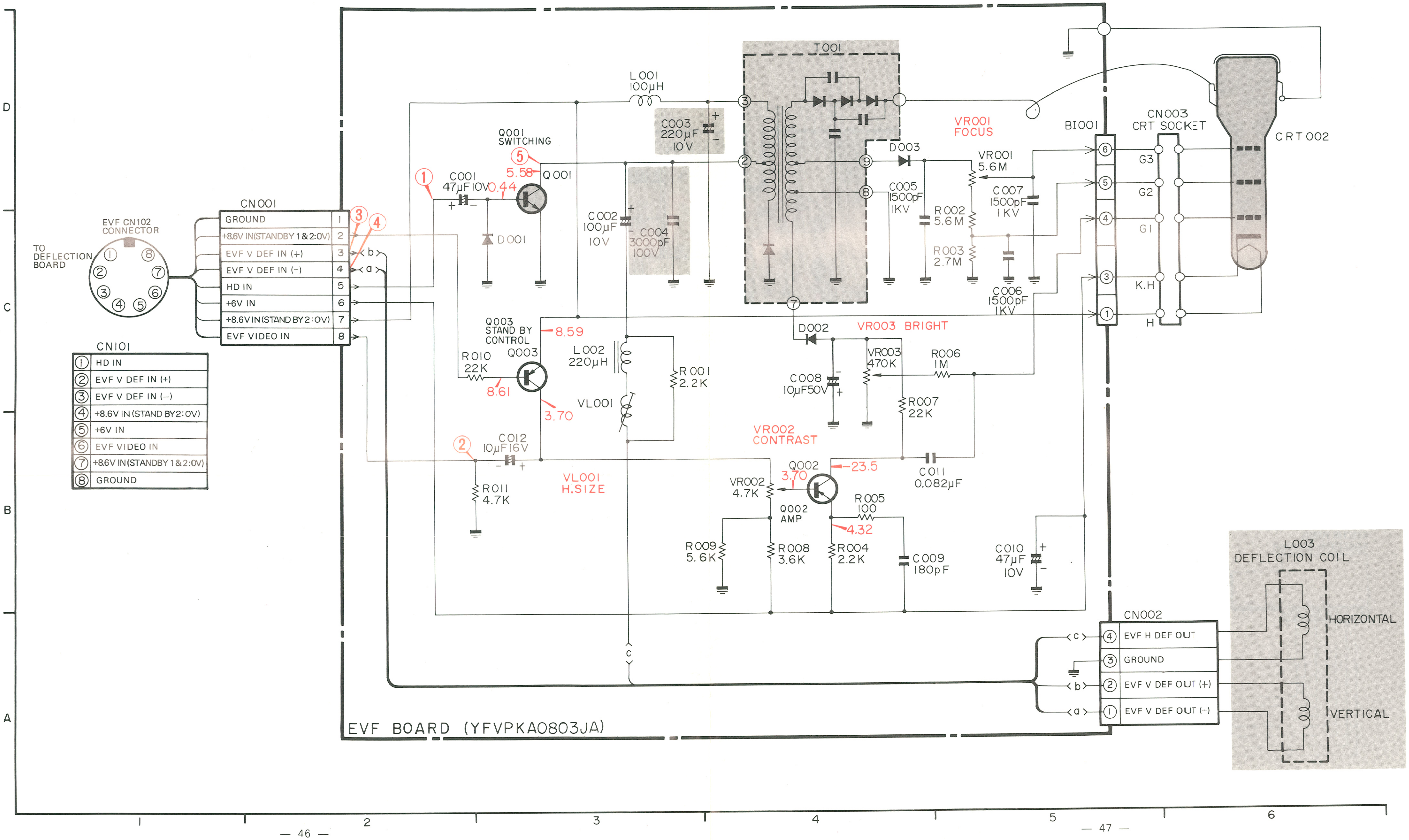


4 1V/DIV, 2ms/DIV

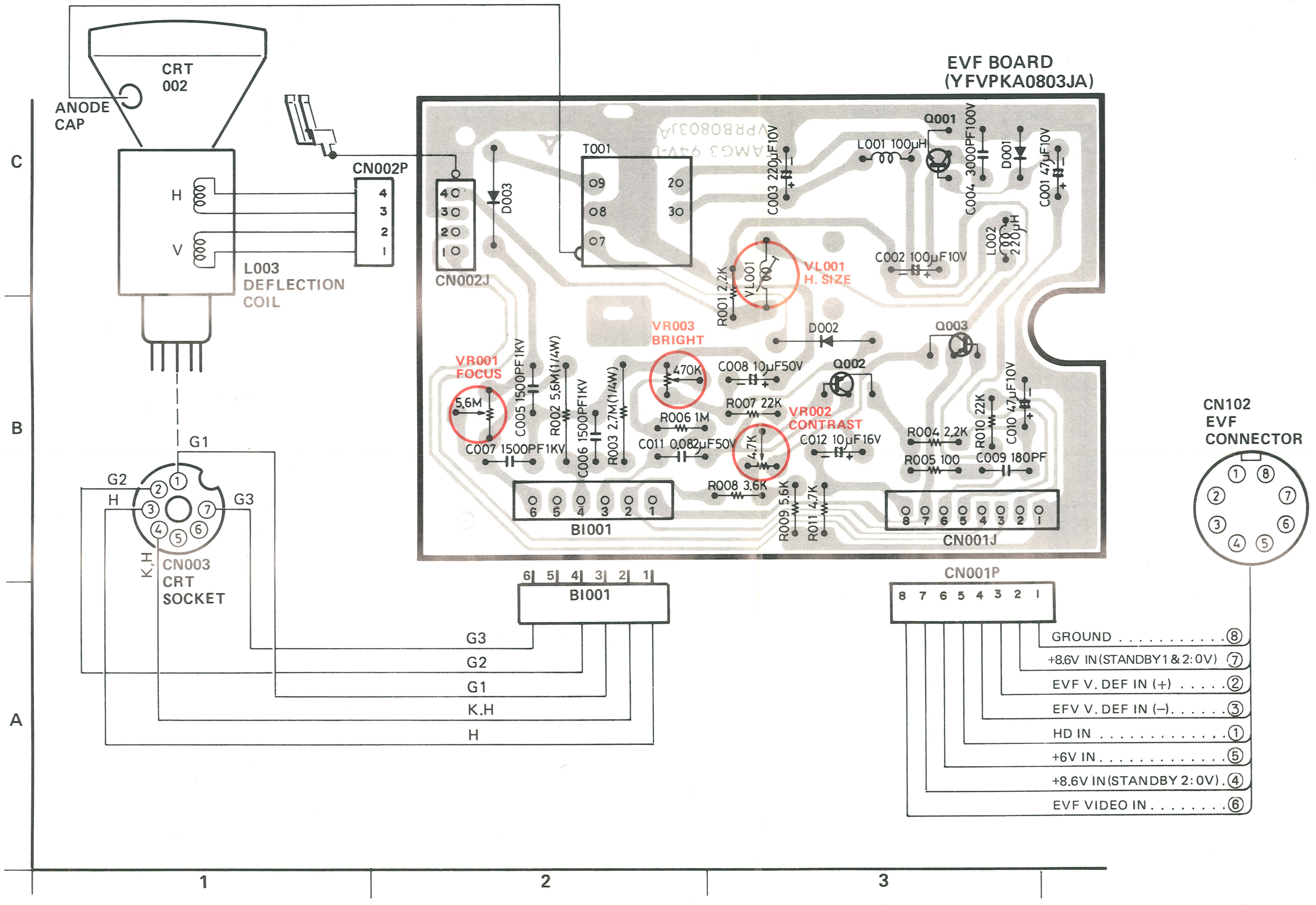


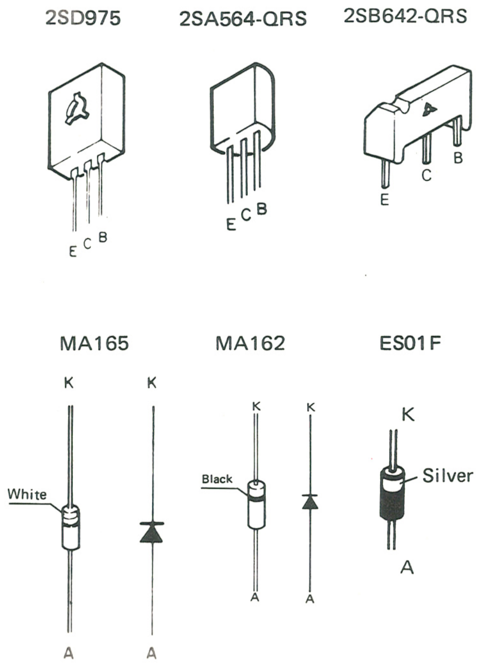
5 50V/DIV, 10µs/DIV





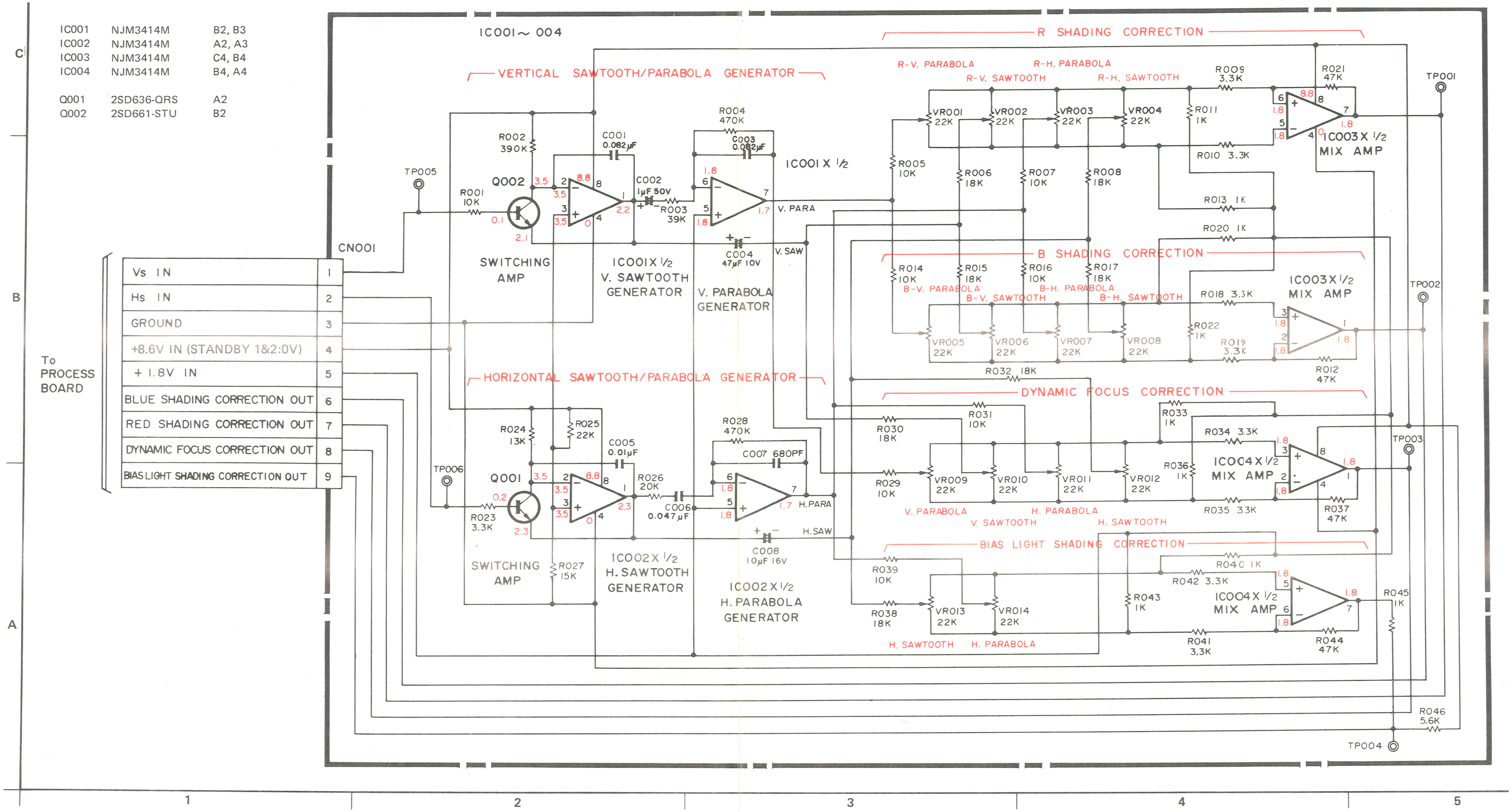
CONDUCTOR VIEW OF ELECTRONIC VIEWFINDER BOARD (YFVPKA0803JA)


CRT
002
ANODE
CAP
H
V
L003
DEFLECTION
COIL
CN002P
4
3
2
1
EVF BOARD
(YFVPKA0803JA)
CN002J
D003
T001
9
8
7
2
3
C003 220μF10V
L001 100μH
Q001
C004 3000PF100V
D001
C001 47μF10V
L002 220μH
C002 100μF10V
R001 2.2K
VL001
VL001
H. SIZE
VR003
BRIGHT
D002
Q003
VR001
FOCUS
5.6M
C005 1500PF1KV
R002 5.6M(1/4W)
C006 1500PF1KV
R003 2.7M(1/4W)
C007 1500PF1KV
470K
C008 10μF50V
Q002
R006 1M
R007 22K
VR002
CONTRAST
C011 0.082μF50V
4.7K
C012 10μF16V
R004 2.2K
R010 22K
C010 47μF10V
R005 100
C009 180PF
R008 3.6K
R009 5.6K
R011 4.7K
BI001
6 5 4 3 2 1
CN001J
8 7 6 5 4 3 2 1
G1
G2
H
G3
K.H
CN003
CRT
SOCKET
CN001P
CN102
EVF
CONNECTOR
G3
G2
G1
K.H
H
GROUND ⑧
+8.6V IN (STANDBY 1 & 2: 0V) ⑦
EVF V. DEF IN (+) ②
EFV V. DEF IN (−) ③
HD IN ①
+6V IN ⑤
+8.6V IN (STANDBY 2: 0V) ④
EVF VIDEO IN ⑥
C
B
A
1
2
3


2SD975
2SA564-QRS
2SB642-QRS
E C B
E C B
E C B
MA165
MA162
ES01F
K
A
White
Black
Silver

Q001	2SD975	C3
Q002	2SB642-QRS	B3
Q003	2SA564-QRS	B3
D001	MA165	C3
D002	MA162	B3
D003	ES01F	C2

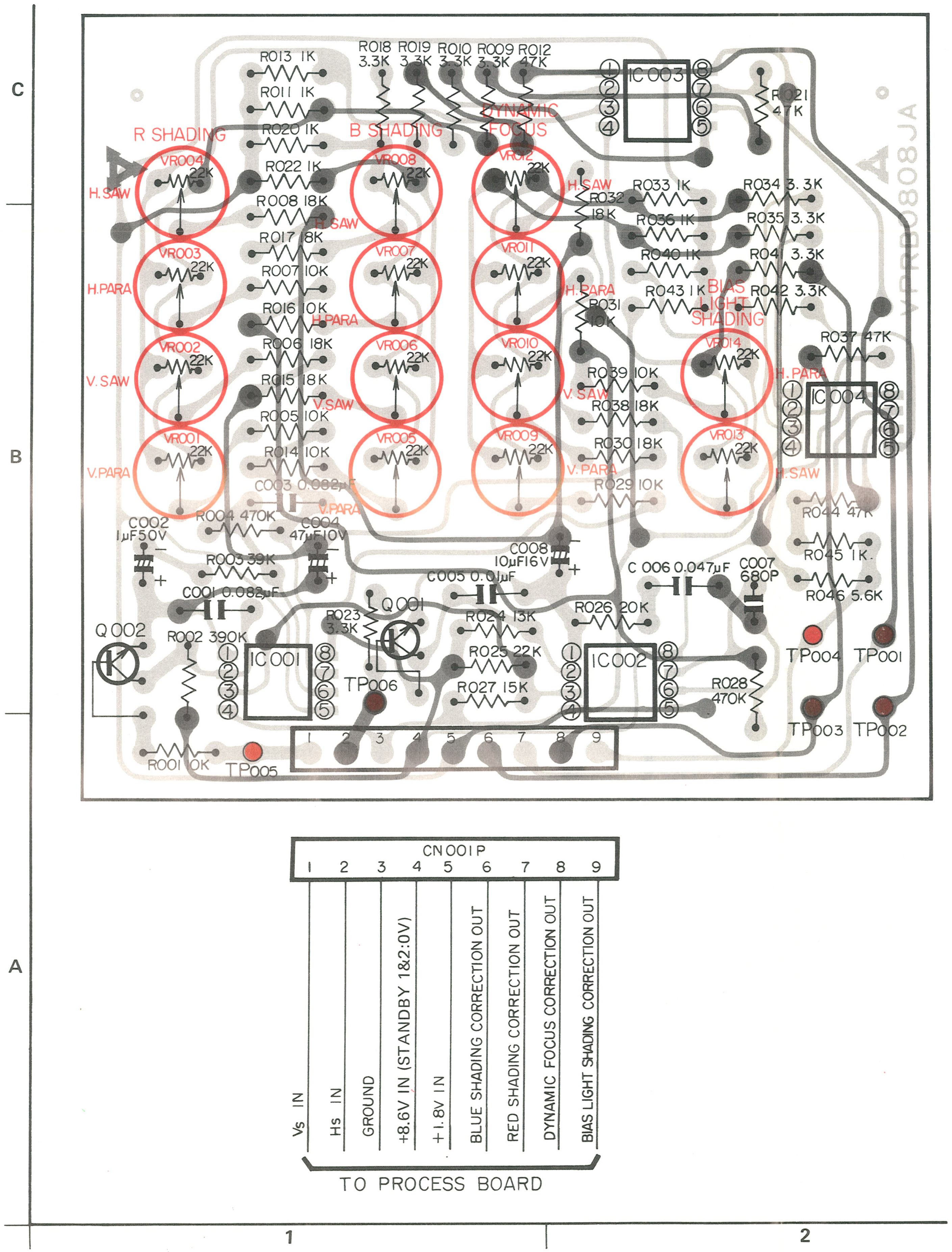
SCHEMATIC DIAGRAM OF CORRECTION BOARD (YFVPKA0808JA)



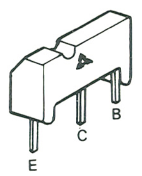
IC001	NJM3414M	B2, B3
IC002	NJM3414M	A2, A3
IC003	NJM3414M	C4, B4
IC004	NJM3414M	B4, A4
Q001	2SD636-QRS	A2
Q002	2SD661-STU	B2

C
B
A
1
2
3
4
5
IC001～004
To PROCESS BOARD
CN001
Vs IN 1
Hs IN 2
GROUND 3
+8.6V IN (STANDBY 1&2:0V) 4
+ 1.8V IN 5
BLUE SHADING CORRECTION OUT 6
RED SHADING CORRECTION OUT 7
DYNAMIC FOCUS CORRECTION OUT 8
BIAS LIGHT SHADING CORRECTION OUT 9
VERTICAL SAWTOOTH/PARABOLA GENERATOR
HORIZONTAL SAWTOOTH/PARABOLA GENERATOR
R SHADING CORRECTION
B SHADING CORRECTION
DYNAMIC FOCUS CORRECTION
BIAS LIGHT SHADING CORRECTION
TP001
TP002
TP003
TP004
TP005
TP006
Q002
Q001
SWITCHING AMP
IC001X 1/2 V. SAWTOOTH GENERATOR
V. PARABOLA GENERATOR
IC001 X 1/2
IC002X 1/2 H. SAWTOOTH GENERATOR
IC002 X 1/2 H. PARABOLA GENERATOR
IC003 X 1/2 MIX AMP
IC004 X 1/2 MIX AMP
R001 10K
R002 390K
R003 39K
R004 470K
C001 0.082μF
C002 1μF 50V
C003 0.082μF
C004 47μF 10V
V. PARA
V. SAW
R023 3.3K
R024 13K
R025 22K
R026 20K
R027 15K
R028 470K
C005 0.01μF
C006 0.047μF
C007 680PF
C008 10μF 16V
H.PARA
H.SAW
R-V. PARABOLA
R-V. SAWTOOTH
R-H. PARABOLA
R-H. SAWTOOTH
VR001 22K
VR002 22K
VR003 22K
VR004 22K
R005 10K
R006 18K
R007 10K
R008 18K
R009 3.3K
R010 3.3K
R011 1K
R013 1K
R020 1K
R021 47K
R014 10K
R015 18K
R016 10K
R017 18K
B-V. PARABOLA
B-V. SAWTOOTH
B-H. PARABOLA
B-H. SAWTOOTH
VR005 22K
VR006 22K
VR007 22K
VR008 22K
R018 3.3K
R019 3.3K
R022 1K
R012 47K
R032 18K
R030 18K
R031 10K
R029 10K
R033 1K
R034 3.3K
R035 3.3K
R036 1K
R037 47K
VR009 22K
VR010 22K
VR011 22K
VR012 22K
V. PARABOLA
V. SAWTOOTH
H. PARABOLA
H. SAWTOOTH
R039 10K
R038 18K
R040 1K
R041 3.3K
R042 3.3K
R043 1K
R044 47K
R045 1K
R046 5.6K
VR013 22K
VR014 22K
H. SAWTOOTH
H. PARABOLA

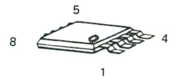
CONDUCTOR VIEW OF CORRECTION BOARD (YFVPKA0808JA)


C
B
A
1
2
R SHADING
B SHADING
DYNAMIC FOCUS
BIAS LIGHT SHADING
H.SAW
H.PARA
V.SAW
V.PARA
VR001 22K
VR002 22K
VR003 22K
VR004 22K
VR005 22K
VR006 22K
VR007 22K
VR008 22K
VR009 22K
VR010 22K
VR011 22K
VR012 22K
VR013 22K
VR014 22K
R013 1K
R011 1K
R020 1K
R022 1K
R008 18K
R017 18K
R007 10K
R016 10K
R006 18K
R015 18K
R005 10K
R014 10K
R018 3.3K
R019 3.3K
R010 3.3K
R009 3.3K
R012 47K
R021 47K
R032 18K
R031 10K
R033 1K
R036 1K
R040 1K
R043 1K
R034 3.3K
R035 3.3K
R041 3.3K
R042 3.3K
R037 47K
R039 10K
R038 18K
R030 18K
R029 10K
R044 47K
R045 1K
R046 5.6K
R004 470K
R003 39K
R002 390K
R001 10K
R023 3.3K
R024 13K
R025 22K
R026 20K
R027 15K
R028 470K
C002 1μF50V
C001 0.082μF
C003 0.082μF
C004 47μF10V
C005 0.01μF
C006 0.047μF
C007 680P
C008 10μF16V
Q001
Q002
IC001
IC002
IC003
IC004
TP001
TP002
TP003
TP004
TP005
TP006
YFVPKA0808JA
CN001P
1 2 3 4 5 6 7 8 9
Vs IN
Hs IN
GROUND
+8.6V IN (STANDBY 1&2:0V)
+1.8V IN
BLUE SHADING CORRECTION OUT
RED SHADING CORRECTION OUT
DYNAMIC FOCUS CORRECTION OUT
BIAS LIGHT SHADING CORRECTION OUT
TO PROCESS BOARD

2SD636-QRS
2SD661-STU



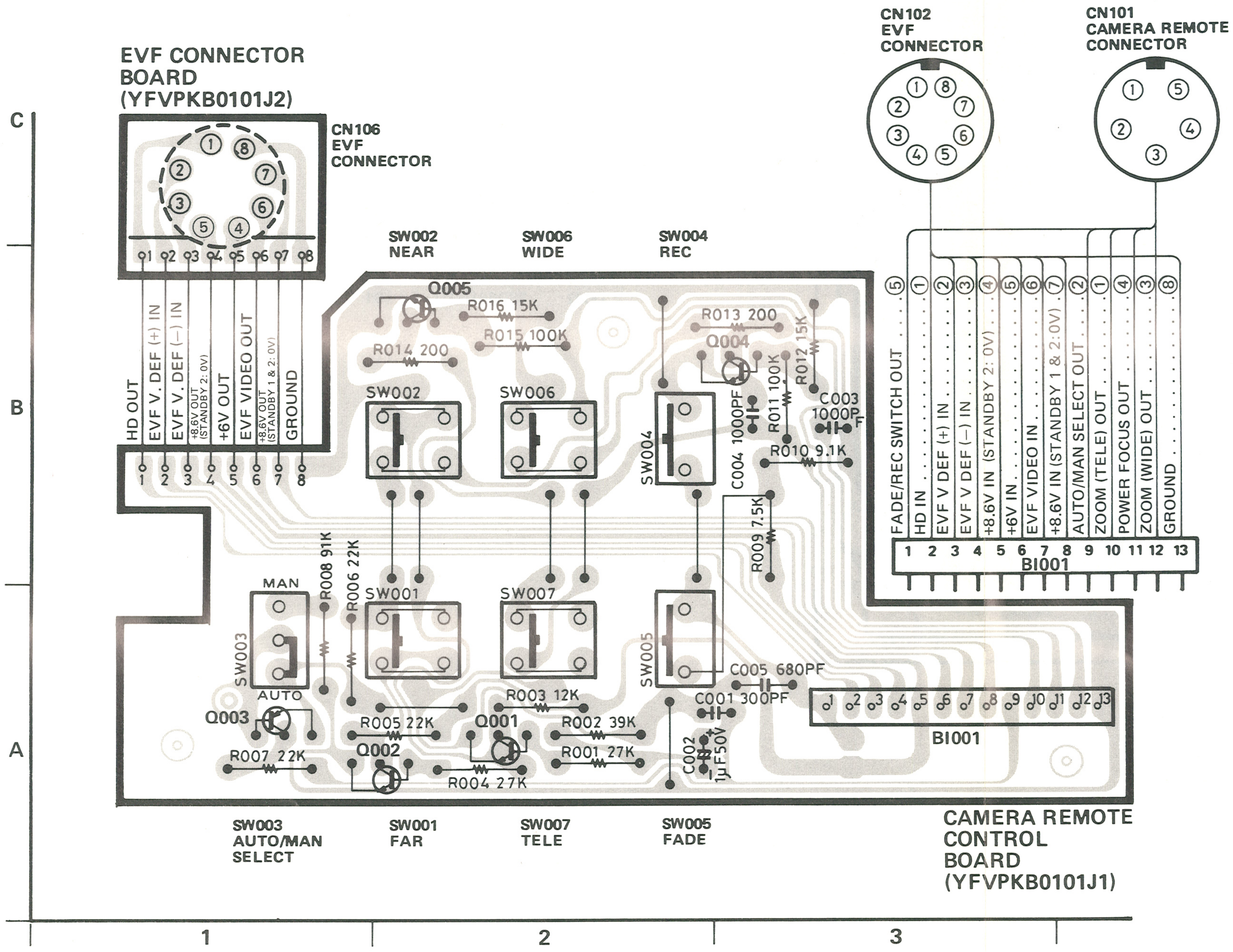
NJM3414M



IC001	NJM3414M	B1
IC002	NJM3414M	B2
IC003	NJM3414M	C2
IC004	NJM3414M	B2
Q001	2SD636-QRS	B1
Q002	2SD661-STU	B1

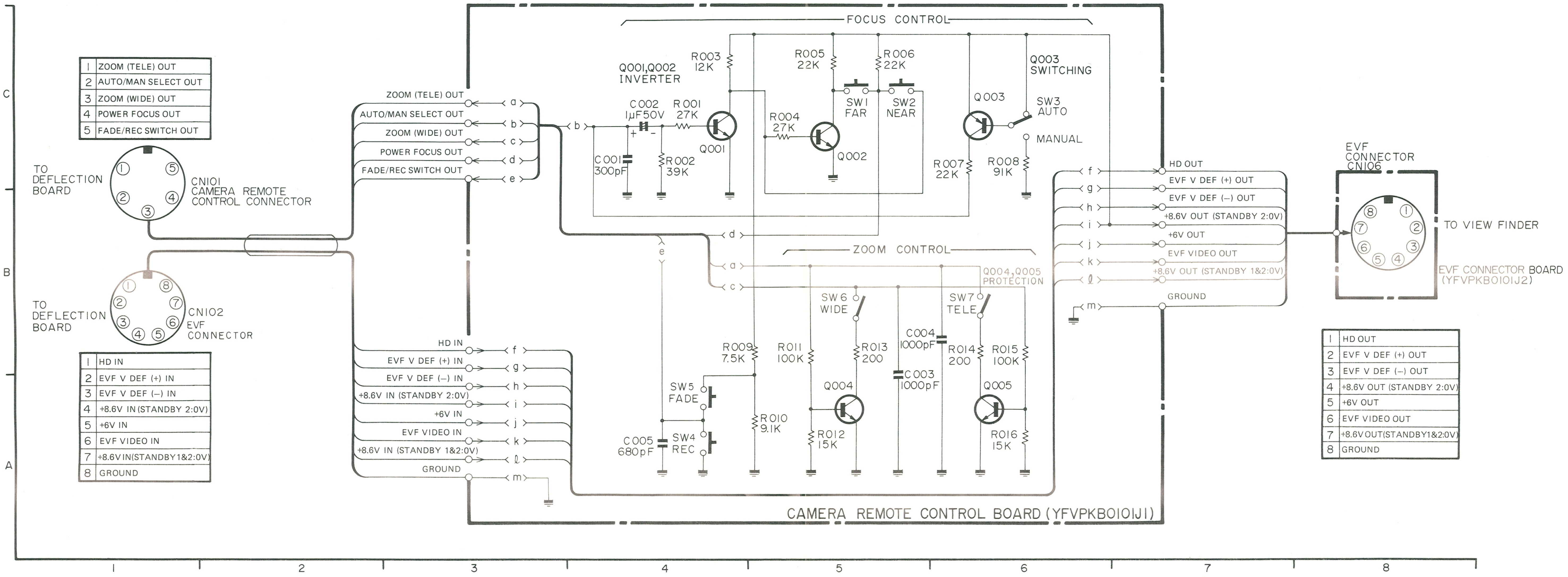
CONDUCTOR VIEW OF CAMERA REMOTE CONTROL BOARD
(WV-CR10)

Q001	2SD636-QR	A2
Q002	2SD636-QR	A2
Q003	2SB788-STU	A1
Q004	2SD636-QR	B3
Q005	2SD636-QR	B2


CN102
EVF
CONNECTOR
CN101
CAMERA REMOTE
CONNECTOR
EVF CONNECTOR
BOARD
(YFVPKB0101J2)
CN106
EVF
CONNECTOR
C
B
A
1
2
3
HD OUT
EVF V. DEF (+) IN
EVF V. DEF (−) IN
+8.6V OUT (STANDBY 2: 0V)
+6V OUT
EVF VIDEO OUT
+8.6V OUT (STANDBY 1 & 2: 0V)
GROUND
SW002
NEAR
SW006
WIDE
SW004
REC
Q005
R016 15K
R015 100K
R014 200
R013 200
Q004
R012 15K
R011 100K
C003
1000PF
C004 1000PF
R010 9.1K
R009 7.5K
SW002
SW006
SW004
MAN
R008 91K
R006 22K
SW001
SW007
SW003
SW005
AUTO
C005 680PF
C001 300PF
R003 12K
Q003
R005 22K
Q001
R002 39K
R007 22K
Q002
R001 27K
R004 27K
C002 1µF50V
BI001
FADE/REC SWITCH OUT
HD IN
EVF V DEF (+) IN
EVF V DEF (−) IN
+8.6V IN (STANDBY 2: 0V)
+6V IN
EVF VIDEO IN
+8.6V IN (STANDBY 1 & 2: 0V)
AUTO/MAN SELECT OUT
ZOOM (TELE) OUT
POWER FOCUS OUT
ZOOM (WIDE) OUT
GROUND
SW003
AUTO/MAN
SELECT
SW001
FAR
SW007
TELE
SW005
FADE
CAMERA REMOTE
CONTROL
BOARD
(YFVPKB0101J1)

SCHEMATIC DIAGRAM OF CAMERA REMOTE CONTROL BOARD (WV-CR10)

Q001	2SD636-QR	C4
Q002	2SD636-QR	C5
Q003	2SB788-STU	C6
Q004	2SD636-QR	A5
Q005	2SD636-QR	A6

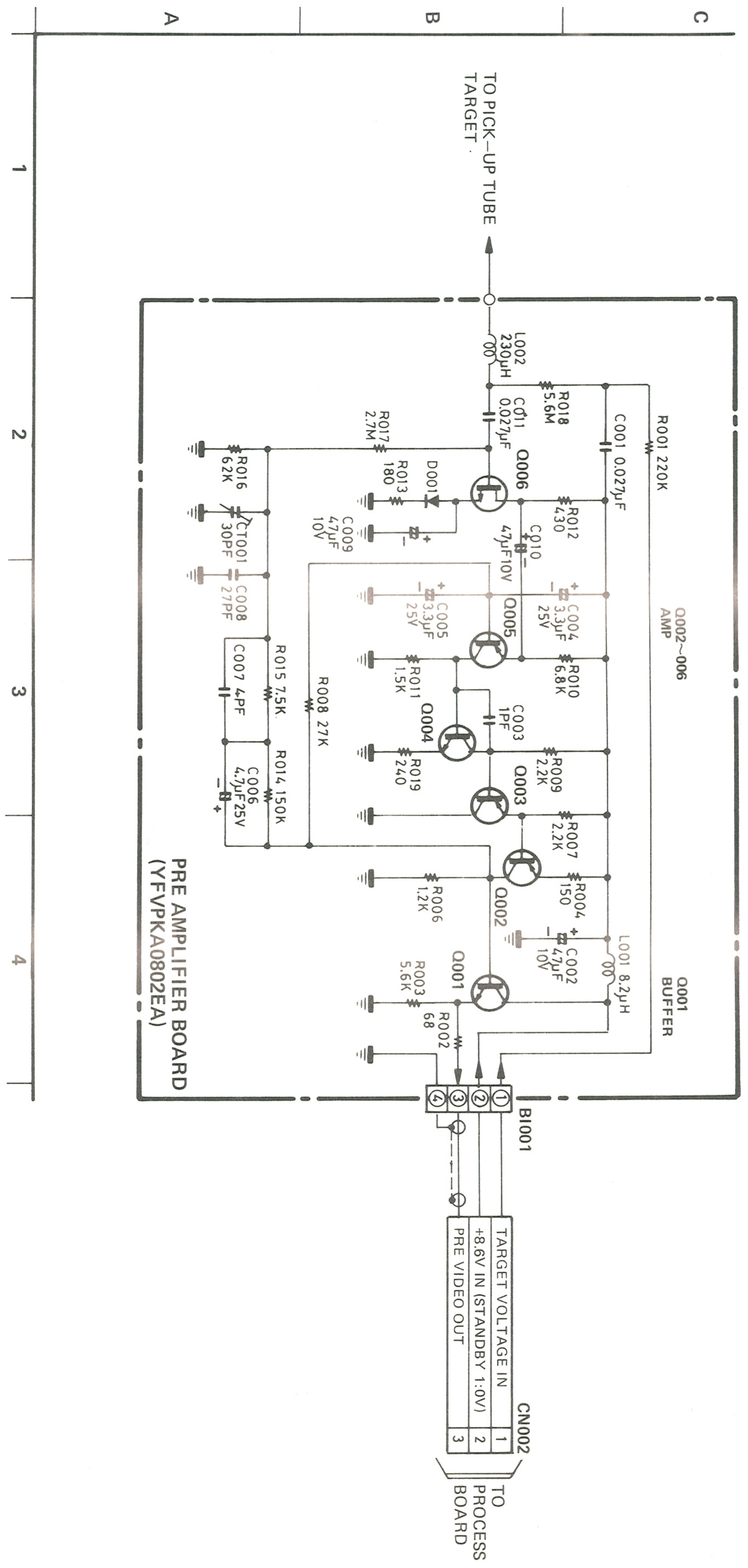

FOCUS CONTROL
ZOOM CONTROL
Q001,Q002 INVERTER
Q003 SWITCHING
Q004,Q005 PROTECTION
R003 12K
R001 27K
R002 39K
R004 27K
R005 22K
R006 22K
R007 22K
R008 91K
R009 7.5K
R010 9.1K
R011 100K
R012 15K
R013 200
R014 200
R015 100K
R016 15K
C001 300pF
C002 1μF50V
C003 1000pF
C004 1000pF
C005 680pF
Q001
Q002
Q003
Q004
Q005
SW1 FAR
SW2 NEAR
SW3 AUTO
MANUAL
SW4 REC
SW5 FADE
SW6 WIDE
SW7 TELE
TO DEFLECTION BOARD
CN101 CAMERA REMOTE CONTROL CONNECTOR
TO DEFLECTION BOARD
CN102 EVF CONNECTOR
ZOOM (TELE) OUT
AUTO/MAN SELECT OUT
ZOOM (WIDE) OUT
POWER FOCUS OUT
FADE/REC SWITCH OUT
HD IN
EVF V DEF (+) IN
EVF V DEF (–) IN
+8.6V IN (STANDBY 2:0V)
+6V IN
EVF VIDEO IN
+8.6V IN (STANDBY 1&2:0V)
GROUND
HD OUT
EVF V DEF (+) OUT
EVF V DEF (–) OUT
+8.6V OUT (STANDBY 2:0V)
+6V OUT
EVF VIDEO OUT
+8.6V OUT (STANDBY 1&2:0V)
GROUND
a b c d e f g h i j k ℓ m
EVF CONNECTOR CN106
TO VIEW FINDER
EVF CONNECTOR BOARD (YFVPKB0101J2)
CAMERA REMOTE CONTROL BOARD (YFVPKB0101J1)
A B C
1 2 3 4 5 6 7 8

1	ZOOM (TELE) OUT
2	AUTO/MAN SELECT OUT
3	ZOOM (WIDE) OUT
4	POWER FOCUS OUT
5	FADE/REC SWITCH OUT

1	HD IN
2	EVF V DEF (+) IN
3	EVF V DEF (–) IN
4	+8.6V IN (STANDBY 2:0V)
5	+6V IN
6	EVF VIDEO IN
7	+8.6V IN(STANDBY1&2:0V)
8	GROUND

1	HD OUT
2	EVF V DEF (+) OUT
3	EVF V DEF (–) OUT
4	+8.6V OUT (STANDBY 2:0V)
5	+6V OUT
6	EVF VIDEO OUT
7	+8.6V OUT(STANDBY1&2:0V)
8	GROUND

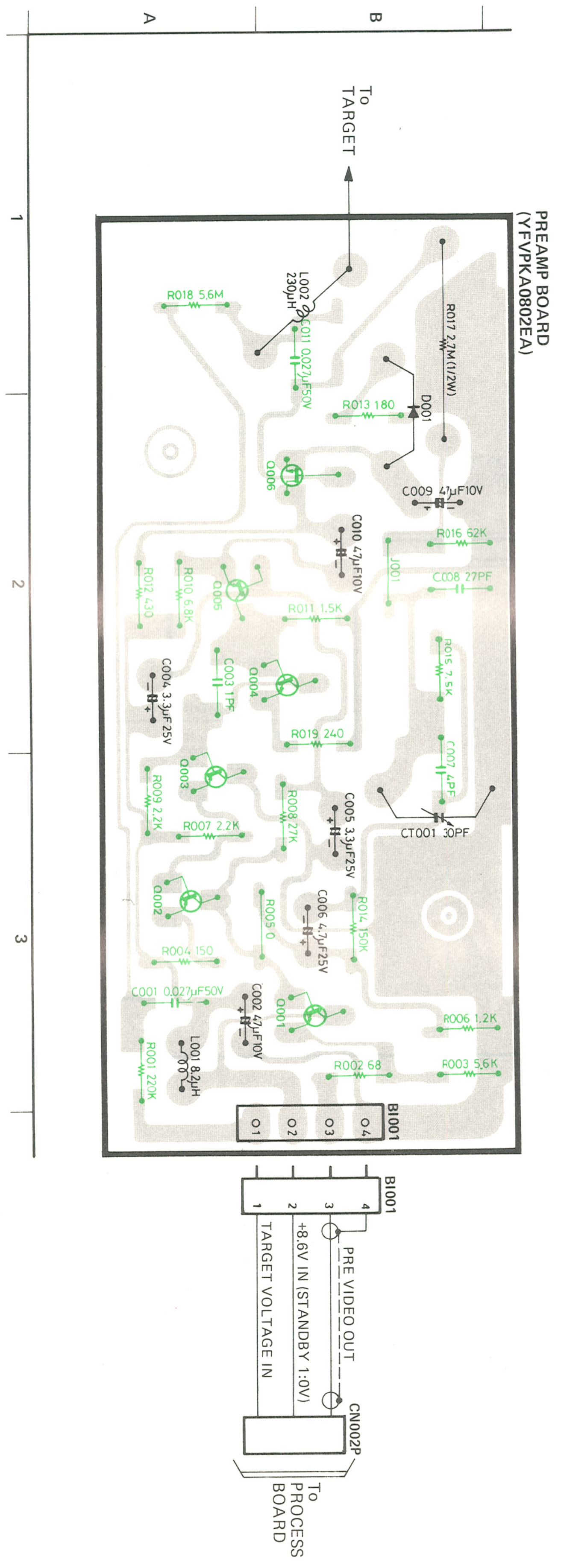
SCHEMATIC DIAGRAM OF PREAMPLIFIER BOARD (YFVPKA0802EA)


A
B
C
1
2
3
4
TO PICK–UP TUBE TARGET
L002 230μH
R018 5.6M
C011 0.027μF
C001 0.027μF
R001 220K
R017 2.7M
R016 62K
CT001 30PF
C008 27PF
R013 180
D001
Q006
C009 47μF 10V
R012 430
C010 47μF 10V
C005 3.3μF 25V
C004 3.3μF 25V
Q005
Q002~006 AMP
R010 6.8K
R011 1.5K
C007 4PF
R015 7.5K
R008 27K
Q004
C003 1PF
R019 240
R009 2.2K
Q003
C006 4.7μF 25V
R014 150K
R007 2.2K
Q002
R006 1.2K
R004 150
C002 47μF 10V
L001 8.2μH
Q001
Q001 BUFFER
R003 5.6K
R002 68
PRE AMPLIFIER BOARD (YFVPKA0802EA)
B1001
TARGET VOLTAGE IN
+8.6V IN (STANDBY 1:0V)
PRE VIDEO OUT
CN002
TO PROCESS BOARD

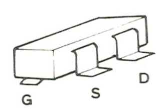
PREAMPLIFIER BOARD

Q001	2SD601-QRS
Q002	2SA1022-CD
Q003	2SA1022-CD
Q004	2SC2404-CD
Q005	2SA1022-CD
Q006	2SK321-QR
D001	MA165

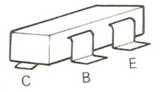
CONDUCTOR VIEW OF PREAMPLIFIER BOARD (YFVPKA0802EA)


A
B
1
2
3
To TARGET
PREAMP BOARD (YFVPKA0802EA)
R018 5.6M
L002 230μH
C011 0.027μF50V
R017 2.7M(1/2W)
R013 180
D001
Q006
C009 47μF10V
C010 47μF10V
R016 62K
C008 27PF
R012 430
R010 6.8K
Q005
R011 1.5K
L001
C004 3.3μF 25V
C003 1PF
Q004
R015 7.5K
R019 240
C007 4PF
Q003
R009 2.2K
R008 27K
R007 2.2K
C005 3.3μF25V
CT001 30PF
Q002
R005 0
C006 4.7μF 25V
R014 150K
R004 150
C001 0.027μF50V
C002 47μF10V
Q001
R006 1.2K
R001 220K
L001 8.2μH
R002 68
R003 5.6K
B1001
TARGET VOLTAGE IN
+8.6V IN (STANDBY 1:0V)
PRE VIDEO OUT
CN002P
To PROCESS BOARD

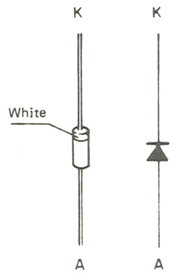
2SK321-QR



2SA1022-CD
2SC2404-CD
2SD601-QRS



MA165



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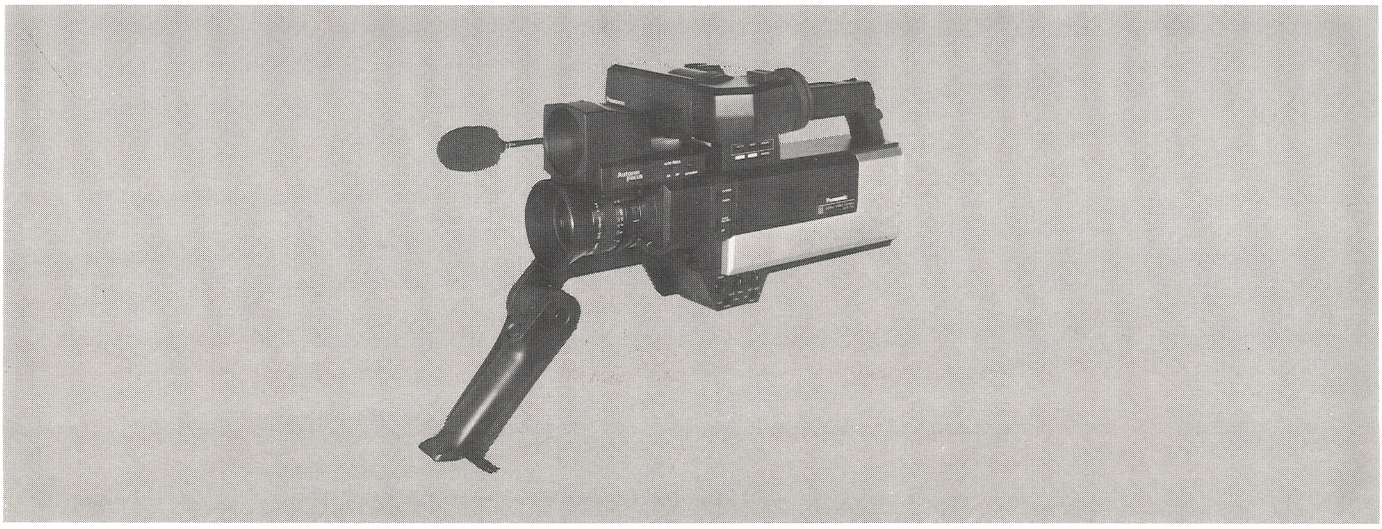
Service Manual

Vol. 4

Replacement Parts List
Exploded View

Colour Video Cameras

WVP-100E/WVP-100N



CONTENTS

PARTS LIST

- Miscellaneous 1
- Preamplifier Board (YFVPKA0802EA) . . . . 1~2
- Deflection Board (YFVPKB1001EA) . . . . 2~4
- Process Board (YFVPKC1001EA) . . . . 4~6
- Micro Processor Board (YFVPKD1001EA) . . . . . . 6~7
- EVF Display Board (YFVPKE1001EA) 7
- VTR Remote Control Connector Board (YFVPKK1001E) 7
- Lens Connector Board (YFVPKF1001EA) 7
- AF Connector Board (YFVPKG1001EA) 7
- EVF Connector Board (YFVPKH1001EA) 7
- Camera Remote Connector Board (YFVPKJ1001EA) 7
- IRIS/COLOR Adjust Board (YFVPKA0804JA) . . . 7~8
- Standby Board (YFVPKB0805JA) 8
- EXT MIC Jack Board (YFVPKC0805JA) 8
- Earphone Jack Board (YFVPKD0805JA) 8
- White Set Switch Board (YFVPKA0806EA) 8
- Adjustable Handle Grip (YWV3100ZK07/YFVPKA0807JA) 8
- Correction Board (YFVPKA0808JA) . . . . 8~9
- EVF Miscellaneous (YFVAKA0072AN) 9
- EVF Board (YFVPKA0803JA) 9
- Microphone Assembly (WM-4026K) 10
- Auto Focus Lens Unit (YFAFLENSUAF3) 10
- Auto Focus Board-A (YFES950-24A) . . . . 10~11
- Auto Focus Board-B (YFES950-24B) 11
- Auto Focus Board-C (YFES950-24C) 11
- Auto Focus Board-D (YFES950-24D) 11
- Accessory Parts/Packaging Parts 11

- Camera Remote Control (WV-CR10E/N)

- Miscellaneous 11
- Camera Remote Control Board (YFVPKB0101JA) . 12
- EVF Connector Board (YFVPKB0101J2) 12
- Accessory Parts/Packaging Parts 12

- VTR Remote Control (WV-VR10E/N)

- Miscellaneous 12
- VTR Remote Control Board 12
- Accessory Parts/Packaging Parts 12

EXPLODED VIEW

- Camera 13
- Auto Focus Lens Unit 13
- Electronic View Finder 14
- Microphone 14
- Adjustable Handle Grip 14
- Camera Remote Control 15
- VTR Remote Control 16

- Packaging Case

- Camera 17
- Camera Remote Control 18
- VTR Remote Control 19

National / Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Vol. 4

Important Notice

REPLACEMENT PARTS LIST

1. Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
2. Components identified by * mark are new parts used from this model.

MODEL WVP-100E/N

CAMERA HEAD MISCELLANEOUS

SYMBOL NO.	PART NO.	DESCRIPTION
V001	*H4100A	Saticon®
C001	ELQE16682N66	Metal 0.0068µF 1600V
L001	ELY18A205H	Deflection Coil Ass'y
CN105	YFSB46001	Saticon® connecting wire Ass'y for CN105 and BI004
CN110	EMCU10B5T10A	Camera Cable and Cable Connector
CN111	YFHSJ0834	Mic Jack
M001	*YFV5EA0070A3	Handle Cover
M002	*YFV6AA0005A3	Handle
M003	*YFV9AA0043AS	Upper Cover Ass'y for WVP-100E
	*YFV9AA0015AS	Upper Cover Ass'y for WVP-100N
M004	*YFV5MA0001A4	Shoe
M005	*YFV4JA0004B4	Leaf Spring for Shoe
M006	*YWFAC17XFM2	Screw for Shoe
M009	*YFV2KA0029B2	Coil Chassis
M012	*YFV2HA0020C3	Shield Plate for Preamp
M013	*YFV2PA0021A4	Control Pin Washer
M014	*YFV3CA0003A4	Coil Holder
M017	*YFV4DA0002A4	Control Pin
M018	*YFV9AA0047AN	Remote Control Cover Ass'y
M019	*YFV9AA0048AN	Left side cover Ass'y for WVP-100E
	*YFV9AA0050AN	Left side cover Ass'y for WVP-100N
M020	*YFV9AA0044AN	Right side cover Ass'y for WVP-100E
	*YFV9AA0049AN	Right side cover Ass'y for WVP-100N
M024	*YFV5RA0005A4	Knob for outdoor/indoor Switch
M025	*YFV5RA0006A4	Knob for White set Switch
M026	*YFV5EC0018A3	White set Switch Cover
M027	*YFV5EB0026AS	Front AF Cover Ass'y
M028	*YFV2HA0021A4	Shield Case A for Vidicon Socket
M029	*YFV2HA0022C4	Shield Case B for Vidicon Socket
M030	*YFV2SA0015C4	Mounting Bracket for upper cover
M031	*YFV9AA0045AS	Display Switch Cover Ass'y
M033	YWCC500LB13	Insulator Washer
M034	YWCC701FR01A	Coil Clamp
M036	YFV7SA0059A4	Caution Label
M037	YFFA-0002	Bias Light Holder Ass'y
M038	*YFVAKA0030AN	Lens Mount Ass'y
M039	*YFV1EA0003AS	Screw for Filter Ass'y
M040	YFCCFILTER	C.C Filter
M041	YFWBFILTER	White Barance Filter
M042	*YFV7QA0130A4	Main Label for WVP-100E
	*YFV7QA0134A4	Main Label for WVP-100N
M044	*YVZC700RB50	Serial No. Label
M045	*YFV5EA0019AS	Rear Cover Ass'y
M046	*YFV5WA0042A4	Standby Label
M047	*YFV5EC0021AS	Bottom Cover Ass'y
M048	*YFV2SA0017A4	Mounting Bracket for Control Circuit Board
M049	YFV5RA0003A4	Control Knob (X2)
M050	* YFV5RA0007A4	Zoom/AGC Switch Knob
M051	* YFV6JA0005A4	Fade Switch Knob
M052	* YFV5VA0006A3	Sholder Pad
M053	* YFV7SB0029A4	Caution Label
M059	* YFV7SA0027A4	EP Label
M142	YF146726	Lens Cap
M143	YF146720	Lens Hood

YFVPKA0802EA PREAMPLIFIER BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB001	*YFVPKA0802EA	Printed Circuit Board Assembly
Q001	2SD601-QRS	Transistor
Q002,003	2SA1022-CD	Transistor
Q004	2SC2404-CD	Transistor
Q005	2SA1022-CD	Transistor
Q006	2SK321-QR	Transistor
D001	MA165	Diode
R001	* ERJ8GCSJ224	Carbon 220KΩ 1/8W
R002	* ERJ8GCSJ680	Carbon 68Ω 1/8W
R003	* ERJ8GCSJ562	Carbon 5.6KΩ 1/8W
R004	* ERJ8GCSG151	Carbon 150Ω 1/8W
R006	* ERJ8GCSG122	Carbon 1.2KΩ 1/8W
R007	* ERJ8GCSJ222	Carbon 2.2KΩ 1/8W
R008	* ERJ8GCSJ273	Carbon 27KΩ 1/8W
R009	* ERJ8GCSG222	Carbon 2.2KΩ 1/8W
R010	* ERJ8GCSG682	Carbon 6.8KΩ 1/8W
R011	* ERJ8GCSG152	Carbon 1.5KΩ 1/8W
R012	* ERJ8GCSG431	Carbon 430Ω 1/8W
R013	* ERJ8GCSJ181	Carbon 180Ω 1/8W
R014	* ERJ8GCSJ154	Carbon 150KΩ 1/8W
R015	* ERJ8GCSG752	Carbon 7.5KΩ 1/8W
R016	* ERJ8GCSJ623	Carbon 62KΩ 1/8W
R017	* ERO50CKG2704	Metal 2.7MΩ 1/2W
R018	* ERJ8GCSK565	Carbon 5.6MΩ 1/8W
R019	* ERJ8GCSG241	Carbon 240Ω 1/8W
C001	* YF426H273XKS	Ceramic 0.027µF
C002	ECEA1EF470	Electrolytic 47µF 25V
C003	* YF426030SLDS	Ceramic 3pF
C004,005	* ECEA25Z3R3	Electrolytic 3.3µF 25V
C005	ECEA16Z10	Electrolytic 10µF 16V
C006	ECEA1VSS4R7	Electrolytic 4.7µF 35V
C007	* YF426070CHDS	Ceramic 7pF

SYMBOL NO.	PART NO.	DESCRIPTION		
C008	*YF426270CHJS	Ceramic	27pF	
C009	ECEA1EF470	Electrolytic	47μF	25V
C010	ECEA10Z47	Electrolytic	47μF	10V
C011	* YF426H273XKS	Ceramic	0.027μF	
CT001	YFTZ03R300F	Trimmer Capacitor		
L001	YWL58R2J	Coil	8.2μH	
L002	YFPREL231TE	Coil	340μH	
J001,002	* ERJ8GC0R00V	Jamper Resister		
CN002-PF	EMCL0417B82V	4 pin Plug Female to Process		

YFVPKB1001EA DEFLECTION BOARD

SYMBOL NO.	PART NO.	DESCRIPTION		
PCB002	* YFVPKB1001EA	Printed Circuit Board Assembly		
IC001	NJM2048M	IC		
IC002	NJM2903M	IC		
IC003,004	NJM3415M	IC		
IC005	AN2510	IC		
Q001,002	⚠2SA715-BC	Transistor		
Q003~006	2SB641-QRS	Transistor		
Q007	2SB745-STU	Transistor		
Q008	2SD636-QR	Transistor		
Q009	2SC1327-STU	Transistor		
Q010	2SD636-QR	Transistor		
Q011	2SD661-STU	Transistor		
Q012	2SB643-QRS	Transistor		
Q013	2SD638-QR	Transistor		
Q014	2SD975	Transistor		
Q015	2SD661-STU	Transistor		
Q016	2SD638-QR	Transistor		
Q017	2SB643-QRS	Transistor		
Q018	2SB788-STU	Transistor		
Q019	2SD958-RST	Transistor		
Q020	2SB788-STU	Transistor		
Q021	2SD639-QRS	Transistor		
Q023	2SD638-QR	Transistor		
Q024	2SD975	Transistor		
Q025	2SB641-QRS	Transistor		
D001,002	EK14	Diode		
D003~005	MA165	Diode		
D007	MA165	Diode		
D008	ES01F	Diode		
D009,010	MA171	Diode		
D012	MA165	Diode		
R001	ERD10TJ681	Carbon	680Ω	1/8W
R002	ERD10TJ821	Carbon	820Ω	1/8W
R003	ERD10TJ162	Carbon	1.6KΩ	1/8W

SYMBOL NO.	PART NO.	DESCRIPTION		
R004	ERD10TJ132	Carbon	1.3KΩ	1/8W
R005,006	ERD10TJ105	Carbon	1MΩ	1/8W
R007	ERD10TJ621	Carbon	620Ω	1/8W
R008	ERD10TJ563	Carbon	56KΩ	1/8W
R009	ERD10TJ473	Carbon	47KΩ	1/8W
R010	ER010TKF3302	Metal	33KΩ	1/8W
R011	*YFCR32104J	Carbon	100KΩ	1/8W
R012	ERD10TJ563	Carbon	56KΩ	1/8W
R013	ERD10TJ821	Carbon	820Ω	1/8W
R014,015	ERD10TJ103	Carbon	10KΩ	1/8W
R016	ERD10TJ682	Carbon	6.8KΩ	1/8W
R017,018	ERD10TJ103	Carbon	10KΩ	1/8W
R019	ERD10TJ682	Carbon	6.8KΩ	1/8W
R020	ERD10TJ680	Carbon	68Ω	1/8W
R021	ERD10TJ681	Carbon	680Ω	1/8W
R022	ERD10TJ561	Carbon	560Ω	1/8W
R023	ERD10TJ152	Carbon	1.5KΩ	1/8W
R024	ERD10TJ752	Carbon	7.5KΩ	1/8W
R025	ERD10TJ153	Carbon	15KΩ	1/8W
R026	ERD10TJ123	Carbon	12KΩ	1/8W
R027	ERD10TJ104	Carbon	100KΩ	1/8W
R028	ERD10TJ222	Carbon	2.2KΩ	1/8W
R029	ERD10TJ223	Carbon	22KΩ	1/8W
R030	ERD10TJ242	Carbon	2.4KΩ	1/8W
R031	ERD10TJ474	Carbon	470KΩ	1/8W
R032,033	ERD10TJ152	Carbon	1.5KΩ	1/8W
R034	ERD10TJ203	Carbon	20KΩ	1/8W
R035	ERD10TJ330	Carbon	33Ω	1/8W
R036	ERD10TJ681	Carbon	680Ω	1/8W
R037	ERD10TJ102	Carbon	1KΩ	1/8W
R038	ERD10TJ332	Carbon	3.3KΩ	1/8W
R039	ERD10TJ180	Carbon	18Ω	1/8W
R040	ERD10TJ334	Carbon	330KΩ	1/8W
R041	ERD10TJ102	Carbon	1KΩ	1/8W
R042	ERD10TJ680	Carbon	68Ω	1/8W
R043	ERD10TJ204	Carbon	200KΩ	1/8W
R044	ERD10TJ104	Carbon	100KΩ	1/8W
R045	ERD10TJ390	Carbon	39Ω	1/8W
R046	ERD10TJ103	Carbon	10KΩ	1/8W
R047	ERD10TJ102	Carbon	1KΩ	1/8W
R048	ERD10TJ151	Carbon	150Ω	1/8W
R049	ERD10TJ221	Carbon	220Ω	1/8W
R050	ERO10CKF18R0	Metal	18Ω	1/8W
R051	ERD10TJ273	Carbon	27KΩ	1/8W
R052	YFLP16J332	Solid Resistor	3.3KΩ	1/8W
R053	ERD10TJ161	Carbon	160Ω	1/8W
R054	ERD10TJ182	Carbon	1.8KΩ	1/8W
R055	ERD10TJ201	Carbon	200Ω	1/8W
R056	ERD10TJ274	Carbon	270KΩ	1/8W
R057	ERD10TJ223	Carbon	22KΩ	1/8W
R058	ERO25CKF3603	Metal	360KΩ	1/4W
R059	ERD25FJ335	Carbon	3.3MΩ	1/4W
R060,061	ERD10TJ103	Carbon	10KΩ	1/8W

SYMBOL NO.	PART NO.	DESCRIPTION		
R062	ERD10TJ391	Carbon	390Ω	1/8W
R063	ERD10TJ272	Carbon	2.7KΩ	1/8W
R064	ERD10TJ222	Carbon	2.2KΩ	1/8W
R065	ERO10CKF47R0	Metal	47Ω	1/8W
R066	ERD10TJ102	Carbon	1KΩ	1/8W
R067	ERO10CKF5601	Metal	5.6KΩ	1/8W
R068	ERO10CKF1302	Metal	13KΩ	1/8W
R069	ERD10TJ333	Carbon	33KΩ	1/8W
R070	ERD10TJ184	Carbon	180KΩ	1/8W
R071,073	ERD10TJ103	Carbon	10KΩ	1/8W
R074	ERD10TJ182	Carbon	1.8KΩ	1/8W
R075	ERD10TJ224	Carbon	220KΩ	1/8W
R077	ERD10TJ4R7	Carbon	4.7Ω	1/8W
R078	ERD10TJ561	Carbon	560Ω	1/8W
R079	ERD10TJ1R0	Carbon	1Ω	1/8W
R080	ERD10TJ102	Carbon	1KΩ	1/8W
R082	ERD10TJ623	Carbon	62KΩ	1/8W
R083	ERD10TJ222	Carbon	2.2KΩ	1/8W
R084	ERO10CKF5101	Metal	5.1KΩ	1/8W
R085	ERD10TJ334	Carbon	330KΩ	1/8W
R086	ERD10TJ362	Carbon	3.6KΩ	1/8W
R087	ERD10TJ512	Carbon	5.1KΩ	1/8W
R088	ERD10TJ471	Carbon	470Ω	1/8W
R089	ERD10TJ564	Carbon	560KΩ	1/8W
R090	ERD10TJ105	Carbon	1MΩ	1/8W
R091	ERD10TJ101	Carbon	100Ω	1/8W
R092	ERD10TJ754	Carbon	750KΩ	1/8W
R096	ERD10TKF1502	Metal	15KΩ	1/8W
R097	ERD10TJ272	Carbon	2.7KΩ	1/8W
R098,099	ERD10TJ104	Carbon	100KΩ	1/8W
R100	ERD10TJ123	Carbon	12KΩ	1/8W
R101	ERD10TJ124	Carbon	120KΩ	1/8W
R102	ERD10TJ823	Carbon	82KΩ	1/8W
R104	ERD10TJ472	Carbon	4.7KΩ	1/8W
R110	*ERJ8GCSJ561	Carbon	560 Ω	1/8W
R111	ERD10TJ562	Carbon	5.6KΩ	1/8W
R112	ERD10TJ472	Carbon	4.7KΩ	1/8W
VR001	YWH0621A6R8K	Variable Resistor	6.8KΩ	
VR002	YWH0621A100	Variable Resistor	100Ω	
VR003	YWH0651A10K	Variable Resistor	10KΩ	
VR004	YWH0651A2R2K	Variable Resistor	2.2KΩ	
VR005	YWH0651A33K	Variable Resistor	33KΩ	
VR006	YWH0651A3R3K	Variable Resistor	3.3KΩ	
VR007	YFH0651A150K	Variable Resistor	150KΩ	
VR008	YWH0651A100	Variable Resistor	100Ω	
VR009	YWH0651A4R7K	Variable Resistor	4.7KΩ	
VR010	YFH0621A1R5K	Variable Resistor	1.5KΩ	
VR011	YWH0651A470K	Variable Resistor	470KΩ	
VR012,013	YWH0651A47K	Variable Resistor	47KΩ	
VR014	YWH0621A47K	Variable Resistor	47KΩ	
Z001	EVM76GA00111	Block Resistor		
C001	YF426472XMS	Ceramic	4700pF	
C002	YF426470SLKS	Ceramic	47pF	
C003	ECEA1ESS101	Electrolytic	100μF	25V

SYMBOL NO.	PART NO.	DESCRIPTION		
C004~006	ECEA1CF221	Electrolytic	220μF	16V
C007	*YF426473XMS	Ceramic	0.047μF	
C008	ECEA1HSS2R2	Electrolytic	2.2μF	50V
C009	*YF426473XMS	Ceramic	0.047μF	
C010	YF426102CHJS	Ceramic	1000pF	
C011	YF426224FZS	Ceramic	0.22μF	
C012	*ECEA1CSS100	Electrolytic	10μF	16V
C013,014	ECEA1CF221	Electrolytic	220μF	16V
C015,016	*YF426472XMS	Ceramic	4700pF	
C017	ECEA1ASS221	Electrolytic	220μF	10V
C018	YF426101XMS	Ceramic	100pF	
C019	*ECEA1HSSR22	Electrolytic	0.22μF	50V
C020	ECEA1ASS101	Electrolytic	100μF	10V
C021	YF426473XKS	Ceramic	0.047μF	
C022,023	ECEA1ASS470	Electrolytic	47μF	10V
C024	*YF426101LKS	Ceramic	100pF	
C025	ECEA1HSS2R2	Electrolytic	2.2μF	50V
C026	ECEA1ASS220B	Electrolytic	22μF	10V
C027	ECEA1ASS470	Electrolytic	47μF	10V
C028	ECEA1HSS2R2	Electrolytic	2.2μF	50V
C029	ECEA1ASS331	Electrolytic	330μF	10V
C030,031	ECEA1ASS470	Electrolytic	47μF	10V
C032	ECEA1AF101	Electrolytic	100μF	10V
C033	ECQP1301JZ	Plastic	300pF	100V
C034	ECEA1AF470	Electrolytic	47μF	10V
C035	ECQV05104J	Plastic	0.1μF	50V
C036	*YF426391CHJS	Ceramic	390pF	
C037,038	ECEA1ASS470	Electrolytic	47μF	10V
C039	ECQK1104JG	Plastic	0.1μF	100V
C040	*YF426102XMS	Ceramic	1000pF	
C041	ECEA1ASS470	Electrolytic	47μF	10V
C042	*YF426221XMS	Ceramic	220pF	
C043	ECEA0JSS330	Electrolytic	33μF	6.3V
C044	ECEA2AS010	Electrolytic	1μF	100V
C045	ECEA0JSS471	Electrolytic	470μF	6.3V
C046	ECQP1152JZ	Plastic	1500pF	100V
C048	ECEA1CSS100	Electrolytic	10μF	16V
C049	ECEA1ASS470	Electrolytic	47μF	10V
C050	*YF426223XKS	Ceramic	0.022μF	
C051	ECEA1HN010SB	Electrolytic	1μF	50V
C052	ECEA1ESS4R7	Electrolytic	4.7μF	25V
C053	ECEA1ASS221	Electrolytic	220μF	10V
C054	*YF426911CHJS	Ceramic	910pF	
C055	ECEA1ASS470	Electrolytic	47μF	10V
C056	ECQV05824JZ	Plastic	0.82μF	50V
C057	ECEA1ESS4R7	Electrolytic	4.7μF	25V
C059	ECEA1ASS470	Electrolytic	47μF	10V
C060	ECQP1752JZ	Plastic	7500pF	100V
C061	ECEA1ASS221	Electrolytic	220μF	10V
C062	ECEA2AS010	Electrolytic	1μF	100V
C063	ECQE2473KS	Plastic	0.047μF	250V
C064	ECEA2AS010	Electrolytic	1μF	100V
C065	ECQE2473KS	Plastic	0.047μF	250V
C066	YFDE979B152K	Ceramic	1500pF	
C067	ECEA2AS010	Electrolytic	1μF	100V
C068	ECEA1CSS100	Electrolytic	10μF	16V

SYM-BOL NO.	PART NO.	DESCRIPTION
C069	* YF426102XMS	Ceramic 1000pF
C070	ECEA0JSS330	Electrolytic 33μF 6.3V
C071	ECEA1ESS4R7	Electrolytic 4.7μF 25V
C080	ECEA1HSS2R2	Electrolytic 2.2μF 50V
C081	ECEA1ASS101	Electrolytic 100μF 10V
C082	ECEA1CSS100	Electrolytic 10μF 16V
L001	YFPC650K	Coil 65μH
L002,003	YFPF471K	Coil 470μH
L004,005	YFPC650K	Coil 65μH
L006	YWL10103JZ	Coil 10mH
L007	YFVL303	Coil 30mH
L008	YFVC101J	Coil 100μH
L009	YWL5150J	Coil 15μH
T001	YFHIPAKC43S	Flyback Transformer
CN001-JM 004-JM	EMCS0550Z	5 pin Jack Male
CN005-JM,	EMCS0850Z	8 pin Jack Male
CN006-JM~ 008-JM	EMCS0250Z	2 pin Jack Male
CN009-JM	EMCS0350Z	3 pin Jack Male
CN010-JM	EMCS0450Z	4 pin Jack Male
CN011-JM	EMCS0750Z	7 pin Jack Male
BI004	* YFSB46001	6 pin Connecting Wire Ass'y for BI004 and CN105
JA	* YFFS2N254B10	10 p Flat Cable
JB	* YFFSN23B10	10p Flat Cable
JC	* YFFSN23B11	11p Flat Cable
M055	* YFV2HA0026B4	SR Shield Case A
M056	* YFV2HA0030A4	SR Shield Case B
M057	* YFV2HA0027A4	SR Shield Cover

YFVPKC1001EA PROCESS BOARD

SYM-BOL NO.	PART NO.	DESCRIPTION
PCB003	* YFVPKC1001EA	Printed Circuit Board Assembly
IC001	AN2110S	IC
IC002	AN2210S	IC
IC003	AN2310S	IC
IC004	AN2410S	IC
IC005	AN2320S	IC
IC006	AN2560S	IC
IC008	NJM3414M	IC
IC009	MN6164	LSI
IC010	AN6914S	IC
IC011	YFMN6160PBS	IC
IC012	EHMSB11H44K	IC
IC013	EHMH1115H45S	IC
Q001	2SC2377-CD	Transistor
Q002	2SD636-QRS	Transistor
Q003	2SC828-QRS	Transistor
Q004	2SD601-QRS	Transistor
Q005,006	2SC2404-CD	Transistor
Q007	2SB643-QRS	Transistor
Q014	2SC2377-CD	Transistor
Q015	2SC828-QRS	Transistor
D001	MA165	Diode
D003~010	MA165	Diode

SYM-BOL NO.	PART NO.	DESCRIPTION
D011,012	YUD1S2688	Diode
D013,014	MA165	Diode
R001	ERD10TJ102	Carbon 1KΩ 1/8W
R002	ERD10TJ223	Carbon 22KΩ 1/8W
R003	ERD10TJ471	Carbon 470Ω 1/8W
R004,005	ERD10TJ102	Carbon 1KΩ 1/8W
R007	ERD10TJ183	Carbon 18KΩ 1/8W
R008	ERD10TJ333	Carbon 33KΩ 1/8W
R009	ERD10TJ102	Carbon 1KΩ 1/8W
R010	ERD10TJ223	Carbon 22KΩ 1/8W
R014	ERD10TJ681	Carbon 680Ω 1/8W
R015	ERD10TJ563	Carbon 56KΩ 1/8W
R017	ERD10TJ184	Carbon 180KΩ 1/8W
R018	YFCR32823JT	Carbon 82KΩ 1/8W
R019	ERJ8GCSG512	Carbon 5.1KΩ 1/8W
R020	ERJ8GCSG821	Carbon 820Ω 1/8W
R021	ERD10TJ123	Carbon 12KΩ 1/8W
R022,024	ERD10TJ102	Carbon 1KΩ 1/8W
R025	ERD10TJ562	Carbon 5.6KΩ 1/8W
R026	ERD10TJ154	Carbon 150KΩ 1/8W
R027	ERD10TJ683	Carbon 68KΩ 1/8W
R029	ERJ8GCSJ751	Carbon 750Ω 1/8W
R030	ERJ8GCSJ182	Carbon 1.8KΩ 1/8W
R031	ERD10TJ184	Carbon 180KΩ 1/8W
R032	ERD10TJ684	Carbon 680KΩ 1/8W
R033	ERJ8GCSJ561	Carbon 560Ω 1/8W
R034	ERD10TJ102	Carbon 1KΩ 1/8W
R035	ERD10TJ822	Carbon 8.2KΩ 1/8W
R036	ERO10CKF1001	Metal 1KΩ 1/8W
R037	ERJ8GCSJ184	Carbon 180KΩ 1/8W
R038	ERJ8GCSJ393	Carbon 39KΩ 1/8W
R039	ERD10TJ153	Carbon 15KΩ 1/8W
R040	ERD10TJ163	Carbon 16KΩ 1/8W
R041	ERD10TJ102	Carbon 1KΩ 1/8W
R042	ERD10TJ123	Carbon 12KΩ 1/8W
R043	ERJ8GCSJ680	Carbon 68Ω 1/8W
R044	ERJ8GCSJ683	Carbon 68KΩ 1/8W
R045	ERJ8GCSJ472	Carbon 4.7KΩ 1/8W
R046	ERD10TJ562	Carbon 5.6KΩ 1/8W
R047,048	ERD10TJ153	Carbon 15KΩ 1/8W
R049	ERD10TJ562	Carbon 5.6KΩ 1/8W
R050	ERD10TJ272	Carbon 2.7KΩ 1/8W
R051	ERD10TJ271	Carbon 270Ω 1/8W
R052	ERD10TJ103	Carbon 10KΩ 1/8W
R053,054	ERD10TJ102	Carbon 1KΩ 1/8W
R055	ERD10TJ152	Carbon 1.5KΩ 1/8W
R056	ERD10TJ273	Carbon 27KΩ 1/8W
R057	ERD10TJ102	Carbon 1KΩ 1/8W
R058	ERD10TJ182	Carbon 1.8KΩ 1/8W
R059	ERJ8GCSJ221	Carbon 220Ω 1/8W
R061	ERJ8GCSJ183	Carbon 18KΩ 1/8W
R065	YFCR32622J	Carbon 6.2KΩ 1/8W
R067~069	ERJ8GCSJ105	Carbon 1MΩ 1/8W
R072	ERJ8GCSJ150	Carbon 15Ω 1/8W
R073	ERJ8GCSJ122	Carbon 1.2KΩ 1/8W
R076	ERJ8GCSJ562	Carbon 5.6KΩ 1/8W

SYM-BOL NO.	PART NO.	DESCRIPTION		
R078	ERJ8GCSJ103	Carbon	10KΩ	1/8W
R079	ERD10TJ202	Carbon	2KΩ	1/8W
R080	ERJ8GCSJ123	Carbon	12KΩ	1/8W
R081	YFCR32102J	Carbon	1KΩ	1/8W
R082	ERJ8GCSJ681	Carbon	680Ω	1/8W
R083	ERD10TJ103	Carbon	10KΩ	1/8W
R084	ERD10TJ391	Carbon	390Ω	1/8W
R085	ERD10TJ471	Carbon	470Ω	1/8W
R087	ERD10TJ102	Carbon	1KΩ	1/8W
R093	ERJ8GCSJ472	Carbon	4.7KΩ	1/8W
R094	ERJ8GCSJ333	Carbon	33KΩ	1/8W
R095	ERJ8GCSJ682	Carbon	6.8KΩ	1/8W
R096	ERD10TJ103	Carbon	10KΩ	1/8W
R097	ERD10TJ112	Carbon	1.1KΩ	1/8W
R098	ERJ8GCSJ272	Carbon	2.7KΩ	1/8W
R099	ERJ8GCSJ471	Carbon	470Ω	1/8W
R100	ERJ8GCSJ391	Carbon	390Ω	1/8W
R101	ERJ8GCSG433	Carbon	43KΩ	1/8W
R102	ERJ8GCSG393	Carbon	39KΩ	1/8W
R115	YFCR32163J	Carbon	16KΩ	1/8W
R116,117	YFCR32124J	Carbon	120KΩ	1/8W
R118,119	YFCR32223J	Carbon	22KΩ	1/8W
R120,121	ERJ8GCSJ683	Carbon	68KΩ	1/8W
R122	ERD10TJ683	Carbon	68KΩ	1/8W
R123	ERD10TJ273	Carbon	27KΩ	1/8W
R124	ERJ8GCSJ683	Carbon	68KΩ	1/8W
R125	ERD10TJ103	Carbon	10KΩ	1/8W
R126	ERD10TJ334	Carbon	330KΩ	1/8W
R127	ERD10TJ273	Carbon	27KΩ	1/8W
R128	ERD10TJ153	Carbon	15KΩ	1/8W
R129	ERD10TJ222	Carbon	2.2KΩ	1/8W
R130, 131	ERD10TJ105	Carbon	1MΩ	1/8W
R132	ERD10TJ273	Carbon	27KΩ	1/8W
R133	ERJ8GCSJ154	Carbon	150KΩ	1/8W
R134	ERD10TJ393	Carbon	39KΩ	1/8W
R135	ERD10TJ223	Carbon	22KΩ	1/8W
R136,137	YFCR32104J	Carbon	100KΩ	1/8W
R138,139	ERD10TJ223	Carbon	22KΩ	1/8W
R140	ERD10TJ104	Carbon	100KΩ	1/8W
R141	ERD10TJ823	Carbon	82KΩ	1/8W
R148	ERJ8GCSJ822	Carbon	8.2KΩ	1/8W
R149	ERJ8GCSJ182	Carbon	1.8KΩ	1/8W
R151	ERD10TJ562	Carbon	5.6KΩ	1/8W
R152	ERD10TJ223	Carbon	22KΩ	1/8W
R153	ERJ8GCSJ272	Carbon	2.7KΩ	1/8W
R154	ERD10TJ562	Carbon	5.6KΩ	1/8W
R166	ERD10TJ103	Carbon	10KΩ	1/8W
R167	ERJ8GCSJ222	Carbon	2.2KΩ	1/8W
R180	ERJ8GCSJ221	Carbon	220Ω	1/8W
R181	YFCR32102J	Carbon	1KΩ	1/8W
R182	ERD10TJ821	Carbon	820Ω	1/8W
R183	ERD10TJ563	Carbon	56KΩ	1/8W
R185	ERD10TJ103	Carbon	10KΩ	1/8W
R186	ERD10TJ272	Carbon	2.7KΩ	1/8W
R187	ERJ8GCSJ272	Carbon	2.7KΩ	1/8W

SYM-BOL NO.	PART NO.	DESCRIPTION		
R188	ERJ8GCSJ154	Carbon	150KΩ	1/8W
R190	ERJ8GCSJ223	Carbon	22KΩ	1/8W
R192	ERD8GCSJ561	Carbon	560Ω	1/8W
R194	ERJ8GCSJ222	Carbon	2.2KΩ	1/8W
R195	ERJ8GCSJ272	Carbon	2.7KΩ	1/8W
R196	YFCR32102	Carbon	1KΩ	1/8W
R197	ERJ8GCSJ164	Carbon	160KΩ	1/8W
R198	ERD10TJ562	Carbon	5.6KΩ	1/8W
R199	YFCR32104J	Carbon	100KΩ	1/8W
R200	ERD10TJ221	Carbon	220Ω	1/8W
R201	ERD10TJ393	Carbon	39KΩ	1/8W
VR001	EVN8ACA00BE4	Variable Resistor	22KΩ	1/8W
VR002	YWH0651A10K	Variable Resistor	10KΩ	
VR003	YFH0621A680X	Variable Resistor	680Ω	
VR004	YWH0651A10K	Variable Resistor	10KΩ	
VR005	YWH0621A1K	Variable Resistor	1KΩ	
VR006	YWH0651A2R2K	Variable Resistor	2.2KΩ	
VR007	YWH0651A3R3K	Variable Resistor	3.3KΩ	
VR008,009	YWH0651A2R2K	Variable Resistor	2.2KΩ	
VR010~012	YWH0651A47K	Variable Resistor	47KΩ	
VR013	YWH0651A2R2K	Variable Resistor	2.2KΩ	
VR014~016	YWH0651A47K	Variable Resistor	47KΩ	
VR017	YWH0621A47K	Variable Resistor	47KΩ	
VR018	YWH0621A470	Variable Resistor	470Ω	
VR019	YWH0621A6R8K	Variable Resistor	6.8KΩ	
VR020	YF6M9S50K	Variable Resistor	50KΩ	
Z001	EXBH84265J	Block Resistor		
Z002	EXBH86263J	Block Resistor		
Z003	EXBD86281J	Block Resistor		
Z004	EXBD85276J	Block Resistor		
Z005	EXBD85277J	Block Resistor		
Z006	EXBD86278J	Block Resistor		
C001	YF426680CHJS	Ceramic	68pF	
C002	ECEA1ASS470	Electrolytic	47μF	10V
C003	YF426473XMS	Ceramic	0.047μF	
C004	ECEA1HS010	Electrolytic	1μF	50V
C005	ECEA1ASS220	Electrolytic	22μF	10V
C006	YF426473XMS	Ceramic	0.047μF	
C007	ECEA1VSS4R7	Electrolytic	4.7μF	35V
C008	ECEA1CSS100	Electrolytic	10μF	16V
C009	ECEA1ASS470	Electrolytic	47μF	10V
C010	ECEA1CSS100	Electrolytic	10μF	16V
C011	YF426222XKS	Ceramic	2200pF	
C012	YF426121CHJS	Ceramic	120pF	
C013	YF426470SLKS	Ceramic	47pF	
C014	YF426473XMS	Ceramic	0.047μF	
C015	ECEA1ASS470	Electrolytic	47μF	10V
C016	ECEA1CSS100	Electrolytic	10μF	16V
C017	ECEA1ASS220	Electrolytic	22μF	10V
C018	ECEA0JS102	Electrolytic	1000μF	6.3V
C019	ECEA1ASS470	Electrolytic	47μF	10V
C021	YF426473XMS	Ceramic	0.047μF	
C022	YF426330CHJS	Ceramic	33pF	
C023,024	ECEA1ASS470	Electrolytic	47μF	10V
C025	YF426473XMS	Ceramic	0.047μF	
C028~030	ECEA1HSS3R3	Electrolytic	3.3μF	50V

SYMBOL NO.	PART NO.	DESCRIPTION		
C031,032	*YF426222XMS	Ceramic	2200pF	
C033	*YF426681SLKS	Ceramic	680pF	
C034	*YF426473XMS	Ceramic	0.047μF	
C035	*YF426681SLKS	Ceramic	680pF	
C036	ECEA1ASS470	Electrolytic	47μF	10V
C037	*YF426681SLKS	Ceramic	680pF	
C039	*YF426180CHKS	Ceramic	18pF	
C040	*YF426220SLKS	Ceramic	22pF	
C041	*YF426222XKS	Ceramic	2200pF	
C042	*YF426473XMS	Ceramic	0.047μF	
C043	ECEA10Z47	Electrolytic	47μF	10V
C044	*YF426330CHJS	Ceramic	33pF	
C045	ECEA10Z47	Electrolytic	47μF	10V
C046	ECEA1CSS100	Electrolytic	10μF	16V
C047,048	ECEA1ASS470	Electrolytic	47μF	10V
C049	*YF426222XMS	Ceramic	2200pF	
C050	*YF426681SLKS	Ceramic	680pF	
C051	ECEA10Z100K	Electrolytic	100μF	10V
C052	*YF426473XMS	Ceramic	0.047μF	
C053	ECEA1ASS470	Electrolytic	47μF	10V·
C054	ECEA1ASS330	Electrolytic	33μF	10V
C055	ECEA1ASS470	Electrolytic	47μF	10V
C056-058	*YF426473XMS	Ceramic	0.047μF	
C059	ECEA0JSS470	Electrolytic	47μF	6.3V
C060-063	*YF426391SLKS	Ceramic	390pF	
C064	*YF426473XMS	Ceramic	0.047μF	
C065	ECEA1ASS470	Electrolytic	47μF	10V
C066	ECEA1CN100S	Electrolytic	10μF	16V
C067,068	*YF426222XMS	Ceramic	2200pF	
C069	*YF426150CHJS	Ceramic	15pF	
C070	*YF426102XMS	Ceramic	1000pF	
C072	ECEA1ASS470	Electrolytic	47μF	10V
C074,075	*YF426101CHJS	Ceramic	100pF	
C078	*YF426471SLKS	Ceramic	470pF	
C090	*YF426221SLKS	Ceramic	220pF	
C091	*YF426101SLKS	Ceramic	100pF	
C095	ECEA1ASS470	Electr	47μF	10V
C099	ECKF1H471KB	Ceramic	470pF	50V
C100	ECQV05104JZ	Plastic	0.1μF	50V
C101	YF426103XMS	Ceramic	0.01μF	
C102	YF426080CHJ	Ceramic	8pF	50V
C103	ECEA1ASS330	Electrolytic	33μF	10V
C104	ECEA1HN010S	Electrolytic	1μF	50V
C105,106	YF426103XMS	Ceramic	0.01μF	
C107	YF426151CHJS	Ceramic	150pF	
C108	ECEA1ASS470	Electrolytic	47μF	10V
C109	ECKF1H562KB	Ceramic	5600pF	50V
C118	ECEA1ASS470	Electrolytic	47μF	10V
CT001,002	YFTZ03R300F	Trimmer Capacitor	30pF	
CT003	YFTZ03R200F	Trimmer Capacitor	20pF	
DL001	EFDMA645K11A	Delay Line		
DL003	EFDMA645A13A	Delay Line		
L001	YWL5101J	Coil	100μH	
L002,003	ELET8R2KAM	Coil	8.2μH	
L006	ELET8R2KAM	Coil	8.2μH	
L007~010	YWL58R2J	Coil	8.2μH	
L011,012	ELET8R2KAM	Coil	8.2μH	

SYMBOL NO.	PART NO.	DESCRIPTION	
L013	ELET2R2KAM	Coil	2.2μH
L014	EL06SI101M	Coil	100μH
L015	ELL7E853D	Coil	
SW001	YWSSS21200	Side Switch	
X001	YFM30917R7M	Crystal Oscillator	
CF001	YFSLC008	Filter	
CF002	YFSLC026	Filter	
CF003	YFSLC011A	Filter	
CF004	YFSLC029	Filter	
CF005	YFSLC010A	Filter	
CF006	YFSLC025	Filter	
CF007	YFSLC022	Filter	
CF008	YFSLC039	Filter	
CN001-PF	EMCM0916D42Y	9 pin Plug Female	
CN001-JM 003-JM	EMCS0350Z	3 pin Jack Male	
CN004-JM	EMCS0380Z	3 pin Jack Male	
CN005-JM	EMCS0750Z	7 pin Jack Male	
CN006-JM	EMCS0650Z	6 pin Jack Male	
CN007-JM	EMCS0350Z	3 pin Jack Male	
CN008	ICS6412663	Socket	
JE	*YFFS2N115D5	5p Flat Cable	
JD	*YFFS2N254B20	20p Flat Cable	
M021	*YFV2HA0051C3	Shield Case A	
M022	*YFV2HA0053B4	Shield Cover for Sync.	
M023	*YFV2HA0040A4	Shield Case B	

YFVPKD1001EA
MICRO PROCESSOR BOARD

SYMBOL NO.	PART NO.	DESCRIPTION		
PCB004	*YFVPKD1001EA	Printed Circuit Board Assembly		
IC001	NJM3414M	IC		
IC002	MN1455AVD2	LSI		
IC003	MN1227A	LSI		
IC004	MN1453AVG1	LSI		
IC005	MN6280	LSI		
Q001	2SD636-QRS	Transistor		
Q002	2SB641-QRS	Transistor		
Q003	2SD661-TU	Transistor		
Q004	2SD636-QRS	Transistor		
Q005	2SD639-QRS	Transistor		
Q006~013	2SB641-QRS	Transistor		
Q014	2SD636-QRS	Transistor		
Q015,016	2SB641-QRS	Transistor		
D001~013	MA165	Diode		
D015	MA165	Diode		
D017	MA165	Diode		
R001	ERD10TJ223	Carbon	22KΩ	
R002	ERJ8GCSJ154	Carbon	150KΩ	
R003	*YFCR32106K or ERJ8GCSJ106	Carbon	10MΩ	1/8W
R004	*ERD10TJ104	Carbon	100KΩ	1/8W
R005	YFCR32102J or *ERJ8GCSJ102	Carbon	1KΩ	1/8W
R006	ERD10TJ333	Carbon	33KΩ	
R007	ERJ8GCSJ103	Carbon	10KΩ	
R008	*ERJ8GCSJ222	Carbon	2.2KΩ	1/8W

SYMBOL NO.	PART NO.	DESCRIPTION
R009	YFCR32333J or ERJ8GCSJ333	Carbon 33KΩ 1/8W
R010	ERD10TJ122	Carbon 1.2KΩ 1/8W
R011	ERD10TJ223	Carbon 22KΩ 1/8W
R012	ERD10TJ103	Carbon 10KΩ 1/8W
R013	ERD10TJ153	Carbon 15KΩ 1/8W
R014	ERD10TJ103	Carbon 10KΩ 1/8W
R015~17	*ERJ8GCSJ103	Carbon 10KΩ 1/8W
R018	*ERJ8GCSJ222	Carbon 2.2KΩ 1/8W
R019	*YFCR32153J	Carbon 15KΩ 1/8W
R020	ERD10TJ562	Carbon 5.6KΩ 1/8W
R021	ERD10TJ223	Carbon 22KΩ 1/8W
R022	ERD10TJ473	Carbon 47KΩ 1/8W
R023	ERD10TJ393	Carbon 39KΩ 1/8W
R024,025	*YFCR32104J	Carbon 100KΩ 1/8W
R026	ERD10TJ562	Carbon 5.6KΩ 1/8W
R027~034	*YFCR32124J	Carbon 120KΩ 1/8W
R035	*YFCR32223J or ERJ8GCSJ223	Carbon 22KΩ 1/8W
R036	*YFCR32223J or ERJ8GCSJ223	Carbon 22KΩ 1/8W
R037	ERD10TJ223	Carbon 22KΩ 1/8W
R038	ERD10TJ562	Carbon 5.6KΩ 1/8W
R039,040	*YFCR32124J	Carbon 120KΩ
R041	ERJ8GCSJ183	Carbon 18KΩ 1/8W
R042~045	ERD10TJ124	Carbon 120KΩ 1/8W
R046	ERD10TJ120	Carbon 12Ω 1/8W
VR001	*YF0622A2R2KB	Semi Fixed Resistor 2.2KΩ 1/8W
C001	ECEA1HN010S	Electrolytic 1μF 50V
C002	*YF426473XMS	Ceramic 0.047μF
C003,004	ECEA0JSS470	Electrolytic 47μF 6.3V
C005	*YFD563WK101J	Ceramic 100pF
C006	ECCF1H471K	Ceramic 470pF
C007,008	ECEA1ESS100	Electrolytic 10μF 25V
C009,010	*YF426100CHJ	Ceramic 10pF
C011	ECEA0JSS471	Electrolytic 470μF 6.3V
C012	*YF426221SLK	Ceramic 220pF
C013~016	*YF426101SLK	Ceramic 100pF
C020	ECQV05104JZ	Plastic 0.1μF 50V
L001	ELET8R2KAM	Coil 8.2μH
X001	EF0A4R0MG01A	Oscillator
CN001-JM	EMCS0450Z	4 pin Jack Male
CN002-JM	EMCS0850Z	8 pin Jack Male
CN003	*YF742J25410	10p Flat Cable Connector
BI001	*EMCZ0318D82V	3 pin Connecting Wire Ass'y for BI001 and CN003 (process)
M032	YFV2HA0028D3	Shield Case
M054	YFV2HA0029D3	Shield Cover

YFVPKE1001EA
EVF DISPLAY BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB005	*YFVPKE1001EA	Printed Circuit Board Assembly
D001~011	1SS133	Diode
SW001~009	EVQQS405K	Push Switch
-JM	YFFSN24C10	10p Flat Cable
CN001-PF	EMCZ0824D63	8 pin Connecting Wire Ass'y

YFVPKK1001EA
VTR REMOTE CONTROL CONNECTOR BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB006	*YFVPKK1001EA	Printed Circuit Board Assembly
CN001-JM	EMCS0850ZL	8 pin Jack Male from Display
CN111	YFRP610RD8S	8 pin Connector

YFVPKF1001EA
LENS CONNECTOR BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB007	*YFVPKF1001EA	Printed Circuit Board Assembly
BI001	EMCZ0810D82V	8pin Connecting Wire Ass'y for BI001 and CN002 (Micro processor)
CN104-PF	YFRP610RD8S	8 pin Connector

YFVPKG1001EA
AF CONNECTOR BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB008	*YFVPKG1001EA	Printed Circuit Board Assembly
BI001	EMCZ0519D82V	5 pin Connecting Wire Ass'y for BI001 and CN003 (Deflection Board)
CN103-JM	YFRP610RD5S	5 pin Connector

YFVPKH1001EA
EVF CONNECTOR BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB009	*YFVPKH1001EA	Printed Circuit Board Assembly
Q001	2SB709-QRS	Transistor
R001	ERJ8GCSJ560	Carbon 56Ω 1/8W
R002	ERJ8GCSJ681	Carbon 680Ω 1/8W
CN102	YFRP610RE8S	8 pin Connector
BI001	EMCZ0811D82V	8 pin Connecting Wire Ass'y for BI001 and CN005 (Deflection Board)

YFVPKJ1001EA
CAMERA REMOTE CONNECTOR BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB019	YFVPKJ1001EA	Printed Circuit Board Assembly
C001	ECEA1AS470	Electrolytic 47μF 10V
CN101	YFRP610RE5S	5 pin Connector
BI001	EMCZ0515D82V	5 pin Connecting Wire Ass'y for BI001 and CN002 (Deflection Board)

YFVPKA0804JA
IRIS/COLOR ADJUST BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB010	YFVPKA0804JA	Printed Circuit Board Assembly
R001	ERD10TJ272	Carbon 2.7KΩ 1/8W
R002	ERD10TJ222	Carbon 2.2KΩ 1/8W
R003,005	ERD10TJ332	Carbon 3.3KΩ 1/8W
R006	ERD10TJ103	Carbon 10KΩ 1/8W
VR001	EVJLCA307B34	Variable Resistor 30KΩ
VR002	EVJLCA307B14	Variable Resistor 10KΩ
SW001	KEG10903	Push Switch

SYMBOL NO.	PART NO.	DESCRIPTION
SW002	YFSSS312L4	Slide Switch
SW003	YWSSF-012M	Slide Switch
SW004	YWSSS322	Slide Switch
BI001	*EMCZ0713D82V	7 pin Connecting Wire Ass'y for BI and CN005 (process)
BI002	*EMCZ0410D82V	4 pin Connecting Wire Ass'y for BI and CN001 (Micro processor)

YFVPKB0805JA
STANDBY BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB011	*YFVPKB0805JA	Printed Circuit Board Assembly
D001	GL9NP2H	LED
R001	ERD10TJ751	Carbon 750Ω 1/8W
R002	ERD10TJ621	Carbon 620Ω 1/8W
R003	ERD10TJ562	Carbon 5.6KΩ 1/8W
SW001	YFSSP643	Slide Switch
BI001	EMCZ0712D82V	7pin Connecting Wire Ass'y for BI001 and CN011 (Deflection Board)

YFVPKC0805JA
EXT MIC JACK BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB012	*YFVPKC0805JA	Printed Circuit Board Assembly
CN108	YFHSJ88211	Mic Jack
CN009-PF	EMCZ0316C52	3 pin Plug Female to Deflection Board

YFVPKD0805JA
EARPHONE JACK BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB013	*YFVPKD0805JA	Printed Circuit Board Assembly
CN107	YFHSJ88211	Earphone Jack
CN007-PF	EMCZ0215B52N	2 pin Plug Female to Deflection Board

YFVPKA0806EA
WHITE SET SWITCH BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB014	*YFVPKA0806EA	Printed Circuit Board Assembly
SW001,002	YFSSF012F	Slide Switch
CN001-PF	EMCZ0311D62	3 pin Plug Female to Process

YFVAKA0028AN
ADJUSTABLE HANDLE GRIP

SYMBOL NO.	PART NO.	DESCRIPTION
PCB015	YWV3100ZK07	REC Switch Board Assembly
SW003	KEC10902	Start/Stop Push Switch
M071	YWCC702HR02A	VCR Knob
PCB016	YFVPKA0807JA	Zoom Switch Board Assembly
SW001,002	KEG10904	Push Switch
CN001-PF	EMCZ0544D62N	5 pin Plug Female
M061	*YFV4AA0001AS	Grip Arm
M062	*YFV4JA0007A4	Coil Spring
M063	*YFV1HA0003AS	Pin
M064	*YFV2TA0005B3	Gear Housing
M065	*YFV4EA0002A3	Gear
M066	*YFV5JA0002A2	Handle Grip Right Cover
M067	*YFV4JA0008A4	Spring Washer
M068	YWCC702LR01	Cord Clamp
M069	*YFV6JA0008A3	Zoom Switch Cover
M070	*YFV2FA0013B4	Cushion for Switch
M071	YWCC702HR02A	REC Push Button
M072	*YFV2TA0004A4	Handle Strap Holder
M073	*YFV5YA0002AS	Band
M074	*YFV5RA0010A4	Handle Grip Lock Button
M075	*YFV1FA0002A4	Nut Plate
M076	*YFV5JA0001A2	Handle Grip Left Cover
M077	*YFV6EA0001A2	Handle Grip Arm Lid
M078	*YFV2TA0006A3	Mounting Brocket
M179	YFV1EA0015A4	Grip Mounting Screw
M180	YFV4JA0027B4	Grip Mounting Spring
M181	YFV3FA0009A4	Grip Mounting Stopper Ring

YFVPKA0808JA
CORRECTION BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB018	*YFVPKA0808JA	Printed Circuit Board
IC001~004	NJM3414M	IC
Q001	2SD636-QRS	Transistor
Q002	2SD661-STU	Transistor
R001	ERD10TJ103	Carbon 10KΩ 1/8W
R002	ERD10TJ394	Carbon 390KΩ 1/8W
R003	ERD10TJ393	Carbon 39KΩ 1/8W
R004	ERD10TJ474	Carbon 470KΩ 1/8W
R005	ERD10TJ103	Carbon 10KΩ 1/8W
R006	ERD10TJ183	Carbon 18KΩ 1/8W
R007	ERD10TJ103	Carbon 10KΩ 1/8W
R008	ERD10TJ183	Carbon 18KΩ 1/8W
R009,010	ERD10TJ332	Carbon 3.3KΩ 1/8W
R011	ERD10TJ102	Carbon 1KΩ 1/8W
R012	ERD10TJ473	Carbon 47KΩ 1/8W
R013	ERD10TJ102	Carbon 1KΩ 1/8W
R014	ERD10TJ103	Carbon 10KΩ 1/8W
R015	ERD10TJ183	Carbon 18KΩ 1/8W
R016	ERD10TJ103	Carbon 10KΩ 1/8W
R017	ERD10TJ183	Carbon 18KΩ 1/8W
R018,019	ERD10TJ332	Carbon 3.3KΩ 1/8W
R020	ERD10TJ102	Carbon 1KΩ 1/8W
R021	ERD10TJ473	Carbon 47KΩ 1/8W
R022	ERD10TJ102	Carbon 1KΩ 1/8W
R023	ERD10TJ332	Carbon 3.3KΩ 1/8W

SYMBOL NO.	PART NO.	DESCRIPTION		
R024	ERD10TJ133	Carbon	13KΩ	1/8W
R025	ERD10TJ223	Carbon	22KΩ	1/8W
R026	ERD10TJ203	Carbon	20KΩ	1/8W
R027	ERD10TJ153	Carbon	15KΩ	1/8W
R028	ERD10TJ474	Carbon	470KΩ	1/8W
R029	ERD10TJ183	Carbon	18KΩ	1/8W
R030,031	ERD10TJ103	Carbon	10KΩ	1/8W
R032	ERD10TJ183	Carbon	18KΩ	1/8W
R033	ERD10TJ102	Carbon	1KΩ	1/8W
R034,035	ERD10TJ332	Carbon	3.3KΩ	1/8W
R036	ERD10TJ102	Carbon	1KΩ	1/8W
R037	ERD10TJ473	Carbon	47KΩ	1/8W
R038	ERD10TJ183	Carbon	18KΩ	1/8W
R039	ERD10TJ103	Carbon	10KΩ	1/8W
R040	ERD10TJ102	Carbon	1KΩ	1/8W
R041,042	ERD10TJ332	Carbon	3.3KΩ	1/8W
R043	ERD10TJ102	Carbon	1KΩ	1/8W
R044	ERD10TJ473	Carbon	47KΩ	1/8W
R045	ERD10TJ102	Carbon	1KΩ	1/8W
R046	ERD10TJ562	Carbon	5.6KΩ	1/8W
VR001~014	YWH0651A22K	Variable Resistor	22KΩ	
C001	ECQV05823JZ	Plastic	0.082μF	50V
C002	ECEA1HSS010	Electrolytic	1μF	50V
C003	ECQV05823JZ	Plastic	0.082μF	50V
C004	ECEA1ASS470	Electrolytic	47μF	10V
C005	ECQV05103JZ	Plastic	0.01μF	50V
C006	ECQV05473JZ	Plastic	0.047μF	50V
C007	ECKF1H681KB	Ceramic	680pF	50V
C008	ECE1CSS100	Electrolytic	10μF	16V
CN001-JM	EMCS0952M	9 pin Jack Male to Micro Processor		
M079	YFV2PA0017A4	Insulator Paper		

YFVAKA0072AN EVF MISCELLANEOUS

SYMBOL NO.	PART NO.	DESCRIPTION
CRT002 △	40JB4	Cathode Ray Tube
L003	ELY15V113C	Deflection Coil
CN003	YFVFSOCKET	CRT Socket
CN101	* YF10F8PB145C	EVF Connector Cable Ass'y
CN001-PF	* YF10F8PB145C	8 pin Connecting Wire Ass'y for CN001 and CN102
M080	*YFV5EA0030A2	EVF Upper Cover
M081	*YFV5EC0031B2	EVF Bottom Cover for WVP-100E
	*YFV5EA0031B2	EVF Bottom Cover for WVP-100N
M082	YWCC704FM02	Fixing Screw for Shoe
M083	YWCC704WM07	Leaf Spring for Shoe
M084	*YFV5MA0002A4	Accessory Shoe
M085	*YFV2CA0011A4	Mounting Nut Plate A
M086	*YFV4JA0009A4	Leaf Spring for CRT
M087	*YFV2CA0010A4	Lock Spring Holder
M088	*YFV4JA0006A4	Lock Spring
M089	*YFV1HA0002A4	Lock Pin
M090	*YFV5RA0009A4	Lock Knob
M091	*YFV2SA0020A4	Mounting Nut Plate B
M092	*YFV2SA0018A4	Reinforce Plate
M093 △	*YFV7MA0027A4	High Voltage Caution Label for WVP-100E
M094	*YFV7SA0048A4	Caution Label for WVP-100E
	*YFV7SA0051A4	Caution Label for WVP-100N
M095	*YFV5EA0032A2	CRT Upper Case
M096	*YFV5EA0033A2	CRT Bottom Case
M097	*YFV5GA0004A4	Eye Cap
M098	*YFV3CA0007A4	Lens Holder
M099	*YFV1VA0002A4	EVF Lens
M100	*YFV3CA0006A3	Eye Cap Holder
M101	*YFV4JA0010A4	Eye Cap Spring
M102	*YFV2VA0005A4	Ground Plate
M103	*YFV1UA0002A4	EVF Mirror
M104	*YFV4JA0005A4	Mirror Support Spring
M105	*YFV2FA0007A4	Face Rubber
M106	*YFV2FA0014A4	CRT Rubber Cushion
M107	*YFV3FA0003A4	Support Ring for CRT Case

YFVPKA0803JA EVF BOARD

SYMBOL NO.	PART NO.	DESCRIPTION		
PCB017	* YFVPKA0803JA	Printed Circuit Board Assembly		
Q001 △	2SD975	Transistor		
Q002	2SB642-QRS	Transistor		
Q003	2SA564-QRS	Transistor		
D001	MA165	Diode		
D002	MA162	Diode		
D003	ES01F	Diode		
R001	ERD10TJ222	Carbon	2.2KΩ	1/4W
R002	ERD25FJ565	Carbon	5.6MΩ	1/4W
R003	ERD25FJ275	Carbon	2.7MΩ	1/4W
R004	ERD10TJ222	Carbon	2.2KΩ	1/8W
R005	ERD10TJ101	Carbon	100Ω	1/8W
R006	ERD10TJ105	Carbon	1MΩ	1/8W
R007	ERD10TJ223	Carbon	22KΩ	1/8W
R008	ERD10TJ362	Carbon	3.6KΩ	1/8W
R009	ERD10TJ562	Carbon	5.6KΩ	1/8W
R010	ERD10TJ223	Carbon	22KΩ	1/8W
R011	ERD10TJ472	Carbon	4.7KΩ	1/8W
VR001	EVM45GA00BV6	Variable Resistor	5.6MΩ	
VR002	YWH0651A4R7K	Variable Resistor	4.7KΩ	
VR003	YWH0651A470K	Variable Resistor	470KΩ	
C001	ECEA1ASS470	Electrolytic	47μF	10V
C002	ECEA10Z100	Electrolytic	100μF	10V
C003 △	ECEA1ASS221	Electrolytic	220μF	10V
C004 △	ECQP1302JZ	Plastic	3000pF	100V
C005~007	* YFDE979B152K	Ceramic	1500pF	
C008	ECEA1HSS100	Electrolytic	10μF	50V
C009	ECCR1H181JC	Ceramic	180pF	50V
C010	ECEA1ASS470	Electrolytic	47μF	10V
C011	ECQV05823JZ	Plastic	0.082μF	50V
C012	ECEA1CSS100	Electrolytic	10μF	16V
VL001	* YFVFSIZECOIL	Coil		
L001	YFVC101J	Coil	10μH	
L002	ELH-5L62	Coil	220μH	
T001 △	* YFHIPAKEVF90	Flyback Transformer		
CN001-JM	EMCS0850Z	8 pin Jack Male		
CN002-JM	EMCS0450Z	4 pin Jack Male		
BI001	* YFVFSOCKET	6 pin connecting wire ass'y for BI001		

SYMBOL NO.	PART NO.	DESCRIPTION

WM-4026K MICROPHONE ASSEMBLY

SYMBOL NO.	PART NO.	DESCRIPTION
CN120	*YPM-EK777AA	Mic Pin Cord
M111	*YFV5EA0034A3	Mic Cover for Right Side
M112	*YFV5EA0035A3	Mic Cover for Left Side
M113	YWCC706WB02	Mic Cushion B
M114	YWCC706WB01	Mic Cushion A
M115	*YPM-MP079AA	Mic Bar Ass'y
M116	*YFWM-043	Mic Unit
M117	*YPM-SM307AA	Mic Unit Cover
M118	YPM-MQ434BA	Wind Screen
M119	*YFV2SA0021A4	Mic Mounting Bracket
M120	*YFV1EA0013A4	Mic Mounting Screw
M121	*YFV4JA0026A4	Mic Mounting Spring
M122	*YFV3FA0008A4	Mic Stopper Ring

YFAFLENSUAF3 AUTO FOCUS LENS UNIT

SYMBOL NO.	PART NO.	DESCRIPTION
S001	*YFES905-06	Focus Ring Position Sensor
CN103-PM	*YFRP610PF-8S	8 pin Connector Wire Ass'y
MIC001	*YFSS520-02	Transducer
M130	*YFAFV-3	AFC Lens
M131	*YFES002-74	AFC Left Side Cover
M132	*YFES901-18	AFC Right Side Cover Ass'y
M133	*YFES002-76	AFC Front Cover
M134	*YFES017-06	Horn
M135	*YFES014-39	Slide Switch Cover
M136	*YFES014-3	Push Switch Knob
M137	*YFES110-11	AF Lens Chassis
M138	*YFES113-03	Senser Shield Case
M140	*YFES519-02	Motor Ass'y
M141	*YFES905-05	Gear Ass'y
M142	*YF146726	Lens Cap
M143	*YF146720	Lens Hood
M144	*YW328231	Zoom Lever

YFES950-24A AUTO FOCUS BOARD-A

SYMBOL NO.	PART NO.	DESCRIPTION		
PCB021	*YFES950-24A	Printed Circuit Board Assembly		
IC001	YFSS514-49	Integrated Circuit		
IC002	TA7120P	Integrated Circuit		
IC003	AN6914	Integrated Circuit		
IC004	NJM78L05A	Integrated Circuit		
IC005	UPD4069UBC	Integrated Circuit		
IC006	UPD4011BC	Integrated Circuit		
IC007	NJM78L05A	Integrated Circuit		
Q001	2SC2603 or 2SC2458	Transistor		
Q002	2SA1115 or 2SA1048	Transistor		
Q003	2SD966	Transistor		
Q004	2SC1317	Transistor		
Q005	2SD966	Transistor		
Q006~009	2SC2603 or 2SC2458	Transistor		
Q010,011	2SC2603 or 2SC2458	Transistor		
D001	YWRA-1Z	Diode		
D002	MA1047	Diode		
D003	MA1091	Diode		
D004~007	YWRA-1Z	Diode		
D008	MA1047	Diode		
D009,010	MA150	Diode		
X001	YFSS14-48	Crystal		
TH001	YFSC010-09	Thermister		
TH002	YFSC300-43	Thermister		
R001	ERD10TJ273	Carbon	27KΩ	1/8W
R002	ERQ14AJ270	Carbon	27Ω	1/4W
R003	ERD10TJ273	Carbon	27KΩ	1/8W
R004	ERD10TJ152	Carbon	1.5KΩ	1/8W
R005	ERC14GK1R8	Solid	1.8Ω	1/4W
R006	ERD10TJ102	Carbon	1KΩ	1/8W
R007	ERD10TJ470	Carbon	47Ω	1/8W
R008	ERD10TJ121	Carbon	120Ω	1/8W
R009	ERD10TJ272	Carbon	2.7KΩ	1/8W
R010	ERD10TJ472	Carbon	4.7KΩ	1/8W
R011	ERD10TJ563	Carbon	56KΩ	1/8W
R012	ERD10TJ183	Carbon	18KΩ	1/8W
R013	ERD10TJ224	Carbon	220KΩ	1/8W
R014	ERD10TJ683	Carbon	68KΩ	1/8W
R015	ERD10TJ152	Carbon	1.5KΩ	1/8W
R016	ERD10TJ473	Carbon	47KΩ	1/8W
R017	ERD10TJ123	Carbon	12KΩ	1/8W
R018	ERD10TJ273	Carbon	27KΩ	1/8W
R020	ERD25VJ185	Carbon	1.8MΩ	1/4W
R021	ERD10TJ102	Carbon	1KΩ	1/8W
R023	ERD10TJ153	Carbon	15KΩ	1/8W
R024	ERD10TJ104	Carbon	100KΩ	1/8W
R026~031	ERD10TJ104	Carbon	100KΩ	1/8W
R032,033	ERD10TJ563	Carbon	56KΩ	1/8W
R034	ERD10TJ564	Carbon	560KΩ	1/8W
R035	ERD10TJ104	Carbon	100KΩ	1/8W
R039	ERD10TJ223	Carbon	22KΩ	1/8W
R042,43	ERD10TJ223	Carbon	22KΩ	1/8W
R044	ERD10TJ333	Carbon	33KΩ	1/8W
R045,046	ERD10TJ223	Carbon	22KΩ	1/8W
R047	ERD10TJ102	Carbon	1KΩ	1/8W
R048	ERD10TJ564	Carbon	560KΩ	1/8W
R049	ERD10TJ102	Carbon	1KΩ	1/8W
R050	ERD10TJ104	Carbon	100KΩ	1/8W
R051	ERD10TJ102	Carbon	1KΩ	1/8W
R052	ERD10TJ103	Carbon	10KΩ	1/8W
VR001	EVNB1AA00B34	Variable Resistor	30KΩ	
VR002	EVNA6AA00B34	Variable Resistor	30KΩ	
VR003	EVNA1AA00B14	Variable Resistor	10KΩ	
C001	ECEA1CS100	Electrolytic	10µF	16V
C002	ECEA1ASS102	Electrolytic	1000µF	10V
C003	ECQM4332K	Plastic	3300pF	400V
C004	ECCF1H102K	Ceramic	1000pF	50V
C005	ECEA1CS100	Electrolytic	10µF	16V
C006	ECEA1HSSR22	Electrolytic	0.22µF	50V
C007,008	ECKF1H103KB	Ceramic	0.01µF	50V

SYMBOL NO.	PART NO.	DESCRIPTION
C009	ECCF1H102K	Ceramic 1000pF 50V
C010	ECSF35ER68	Electrolytic 0.68μF 35V
C011	ECEA1CS100	Electrolytic 10μF 16V
C012	ECQS1271JZ	Polyester 270pF 50V
C013~018	ECFDE203ZB	Ceramic 0.02μF 50V
C019	ECCF1H121J	Ceramic 120pF 50V
C020	ECCF1H471J	Ceramic 470pF 50V
C021	ECEA1CS100	Electrolytic 10μF 50V
C025,026	ECEA1HS010	Electrolytic 1μF 50V
C027	ECEB1HS010	Electrolytic 1μF 50V
C034	ECEA1ES220	Electrolytic 22μF 25V
L001	YFSS506-96	Band Pass Filter
T001	YFSS506-97	Transformer
SW001	YFSC300-43	Slide Switch
CN001-JM	YFSS111-75	7-pin Jack Male
CN102-PM	RP610P5PA10	5-pin Connecting Wire Ass'y
M186	YFES113-04	Shield Case (A)
M187	YFES113-05	Shield Case (B)

YFES950-24B
AUTO FOCUS BOARD-B

PCB022	*YFES950-24B	Printed Circuit Board Assembly
IC008	AN6914	Integrated Circuit
Q012	2SA720-QR	Transistor
Q013	2SD965-QR	Transistor
Q015	2SA720-QR	Transistor
Q016	2SD965-QR	Transistor
R053	ERD10TJ184	Carbon 180KΩ 1/8W
R054	ERD10TJ274	Carbon 270KΩ 1/8W
R055	ERD10TJ332	Carbon 3.3KΩ 1/8W
R056	ERD10TJ152	Carbon 1.5KΩ 1/8W
R057	ERD10TJ682	Carbon 6.8KΩ 1/8W
R058	ERD10TJ392	Carbon 3.9KΩ 1/8W
R059	ERD10TJ472	Carbon 4.7KΩ 1/8W
R060, 061	ERD10TJ222	Carbon 2.2KΩ 1/8W
R062,063	ERD10TJ102	Carbon 1KΩ 1/8W
R064	ERD10TJ472	Carbon 4.7KΩ 1/8W
R065	ERD10TJ222	Carbon 2.2KΩ 1/8W
CN002-PM	YFB2B-XH	2-pin Connector with Cable

YFES950-24C
AUTO FOCUS BOARD-C

PCB023	*YFES950-24C	Printed Circuit Board Assembly
SW002	EVQQJ104K	Push Switch

YFES950-24D
AUTO FOCUS BOARD-D

SYMBOL NO.	PART NO.	DESCRIPTION
PCB024	*YFES950-24D	Printed Circuit Board Assembly
Q017	2SC2458	Transistor
Q018	2SA1048	Transistor
Q019	2SC2458	Transistor
Q020	2SB873	Transistor
R005	ERD10TJ1R8	Carbon 1.8Ω 1/8W
R068	ERD10TJ103	Carbon 10KΩ 1/8W
R069	ERD10TJ222	Carbon 2.2KΩ 1/8W
R070	ERD10TJ223	Carbon 22KΩ 1/8W
R071	ERD10TJ562	Carbon 5.6KΩ 1/8W
R072	ERD10TJ222	Carbon 2.2KΩ 1/8W
R073	ERD10TJ562	Carbon 5.6KΩ 1/8W
R074	ERD10TJ103	Carbon 10KΩ 1/8W
R075	ERD10TJ471	Carbon 470Ω 1/8W
C029	ECEA1CS470	Electrolytic 47μF 16V
C030	ECKF1H103KB	Ceramic 0.01μF 50V
C039	ECCF1H392K	Ceramic 0.039μF 50V

ACCESSORY PARTS/PACKAGING PARTS

M150	*YFV8QA0106AN *YFV8QA0109AN	Operating Instructions for WVP-100E Operating Instructions for WVP-100N
M151	YFPTM81C21	Warranty Card
M152	YZB20X35A02	Polyethylene Bag for Cable and E.V.F
M153	XZB26X40C05	Polyethylene Bag for Operating Instruction
M154	XZB38X70A02	Polyethylene Bag for Camera
M155	*YFV9CA0127AN *YFV9CA0132AN	Packaging Case for WVP-100E Packaging Case for WVP-100N

WV-CR10E/N CAMERA REMOTE CONTROL

MISCELLANEOUS

E001	*YFRCABLE90	Remote Control Cable Ass'y
M002	*YFV5WA0080AS *YFV5WA0070AS	Upper Cover Ass'y for WV-CR10E Upper Cover Ass'y for WV-CR10N
M003	*YFV5EA0054A2	Bottom Cover
M004	*YFV5RA0011A4	Slide Switch Knob
M005	*YFV6JA0006A4	Push Knob (X2)
M006	*YFV6JA0011A4	Zoom and Focus Knob (X2)
M007	*YFV6JA0012A4	Lock Knob
M008	*YFV2CA0012A4	Mounting Plate
M009	YFV2CA0018A4	Mounting Angle
M010	*YFV2SA0024A4	Mounting Plate for 8 pin Connector
M011	*YFV4RA0002A4	Lock Arm Lever
M012	*YFV2FA0021B4	Switch Cushion
M013	*YFV2PA0018B4	Insulater Sheet for Circuit Board
M014	*YFV4JA0015A4	Leaf Spring
M015	*YFV4JA0016A4	Coil Spring
M016	*YFV7QA0153A4 *YFV7QA0137A4	Main Label for WV-CR10E Main Label for WV-CR10N
M018	*YFV4DA0003A4	Lock Cam
M023	YVZC700RB50 YWV240PUB01D	Serial No. Label for WV-CR10E Serial No. Label for WV-CR10N

YFVPKB0101JA CAMERA REMOTE CONTROL BOARD

SYMBOL NO.	PART NO.	DESCRIPTION		
PCB001	*YFVPKB0101JA	Printed Circuit Board Assembly		
Q001,002	2SD636-QRS	Transistor		
Q003	2SB788-STU	Transistor		
Q004,005	2SD636-QRS	Transistor		
R001	ERD10TJ273	Carbon	27KΩ	1/8W
R002	ERD10TJ393	Carbon	39KΩ	1/8W
R003	ERD10TJ123	Carbon	12KΩ	1/8W
R004	ERD10TJ273	Carbon	27KΩ	1/8W
R005~007	ERD10TJ223	Carbon	22KΩ	1/8W
R008	ERD10TJ913	Carbon	91KΩ	1/8W
R009	ERD10TJ752	Carbon	7.5KΩ	1/8W
R010	ERD10TJ912	Carbon	9.1KΩ	1/8W
R011	ERD10TJ104	Carbon	100KΩ	1/8W
R012	ERD10TJ153	Carbon	15KΩ	1/8W
R013,014	ERD10TJ201	Carbon	200Ω	1/8W
R015	ERD10TJ104	Carbon	100KΩ	1/8W
R016	ERD10TJ153	Carbon	15KΩ	1/8W
C001	ECKF1H301KB	Ceramic	300pF	50V
C002	ECEA1HSS010	Electrolytic	1μF	50V
C003,004	ECKF1H102KB	Ceramic	1000pF	50V
C005	ECKF1H681KB	Ceramic	680pF	50V
SW001,002	EVQQS405K	Push Switch		
SW003	YWSSF-012M	Slide Switch		
SW004,005	KEG10904	Push Switch		
SW006,007	EVQQS405K	Push Switch		
CN001-JM	EMCS1350ZL	13 pin Jack Male		
M025	YFV2NA0005A4	Spacer for Switch		

YFVPKB0101J2 EVF CONNECTOR BOARD

PCB002	*YFVPKB0101J2	Printed Circuit Board Assembly
CN106	YFRP610RD8S	8 pin Connector

ACCESSORY PARTS/PACKAGING PARTS

M018	*YFV8QA0111AN	Operating Instruction for WV-CR10E
	*YFV8QA0108AN	Operating Instruction for WV-CR10N
M019	*YFV9CA0146AN	Packaging Case for WV-CR10E
	*YFV9CA0133AN	Packaging Case for WV-CR10N
M020	YFV8EA0001A4	Polyethylene Bag for Remote Connector
M021	YWT15X20C03	Polyethylene Bag for Operating Instruction
M022	YWT20X35C03	Polyethylene Bag for Power Cord

WV-VR10E/N VTR REMOTE CONTROL

MISCELLANEOUS

SYMBOL NO.	PART NO.	DESCRIPTION
CN001	YFRP68PL180	VTR Remote Control Connector Ass'y
M001	*YFV5WB0041AS	VTR Remote Control Cover Ass'y
M002	*YFV5KA0018A3	VTR Remote Control Bottom Cover
M003	*YFV6JA0006A4	Push Button (X5)
M004	*YFV2FA0029A4	VTR Remote Control Knob Cushion
M005	*YFV5RA0008A4	Knob for Slide Switch
M006	*YFV5RA0018A4	Lock Knob
M007	*YFV7QA0154A4	Main Label for WV-VR10E
	*YFV7QA0136A4	Main Label for WV-VR10N
M008	YVZC700RB50	Serial No. Label

YFVPKB0101EA VTR REMOTE CONTROL BOARD

PCB001	*YFVPKB0101EA	Printed Circuit Board Assembly
D001~005	1SS133	Diode
SW001~005	EVQQS405K	Push Switch
SW006	YFSSS3124L4	Slide Switch
CN001-JM	EMCS0850ZL	8 pin Jack Male

ACCESSORY PARTS/PACKAGING PARTS

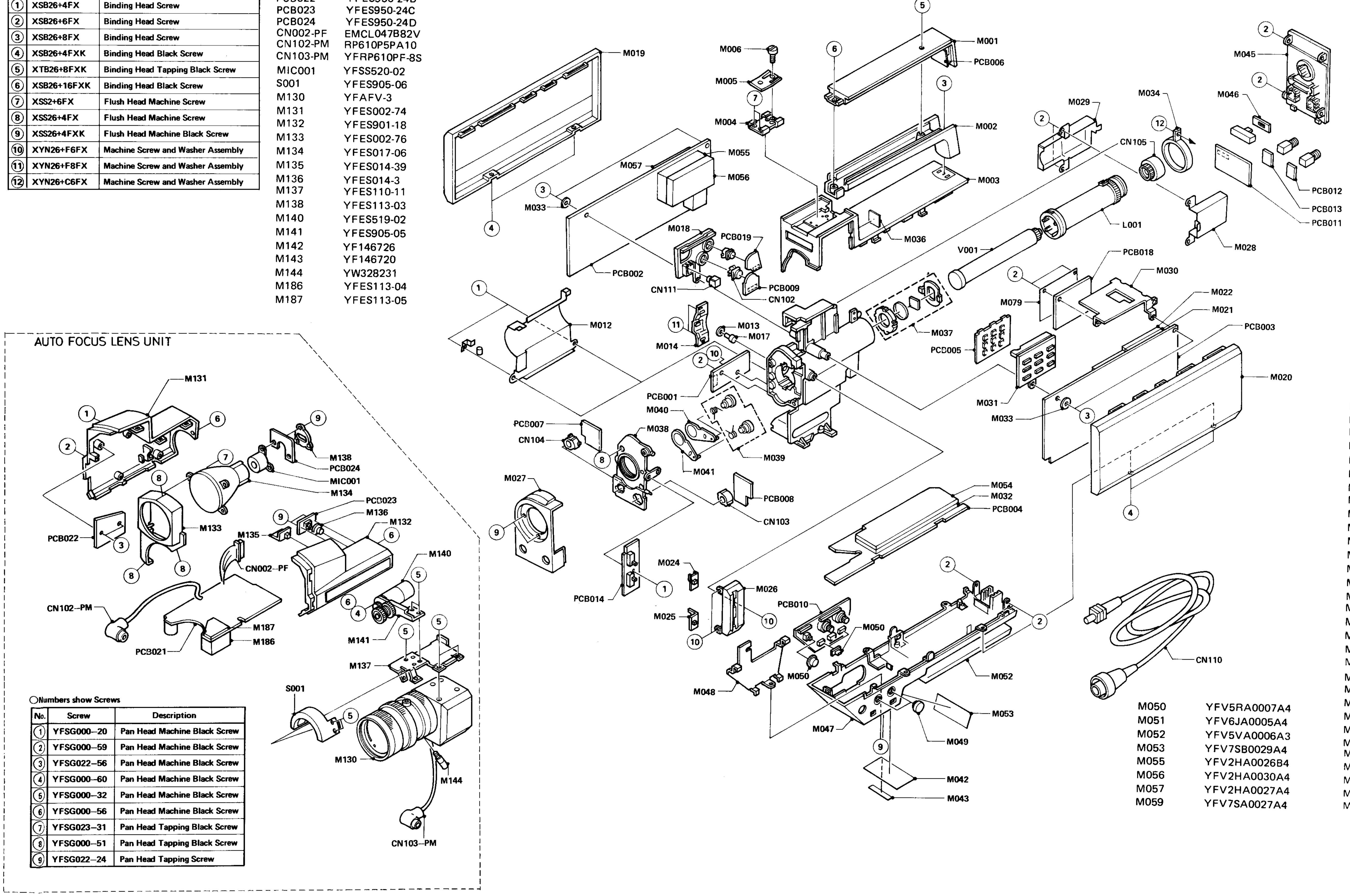
M010	*YFV8QA0111AN	Operating Instruction
M011	YFV8EA0002AN	Polyethylene Bag for Remote Control
M012	*YFV9CA0146AN	Packaging Case for WV-VR10E
	*YFV9CA0131AN	Packaging Case for WV-VR10N

EXPLODED VIEW OF CAMERA

○Numbers show Screws

No.	Screw	Description
①	XSB26+4FX	Binding Head Screw
②	XSB26+6FX	Binding Head Screw
③	XSB26+8FX	Binding Head Screw
④	XSB26+4FXK	Binding Head Black Screw
⑤	XTB26+8FXK	Binding Head Tapping Black Screw
⑥	XSB26+16FXK	Binding Head Black Screw
⑦	XSS2+6FX	Flush Head Machine Screw
⑧	XSS26+4FX	Flush Head Machine Screw
⑨	XSS26+4FXK	Flush Head Machine Black Screw
⑩	XYN26+F6FX	Machine Screw and Washer Assembly
⑪	XYN26+F8FX	Machine Screw and Washer Assembly
⑫	XYN26+C6FX	Machine Screw and Washer Assembly

PCB021	YFES950-24A
PCB022	YFES950-24B
PCB023	YFES950-24C
PCB024	YFES950-24D
CN002-PF	EMCL047B82V
CN102-PM	RP610P5PA10
CN103-PM	YFRP610PF-8S
MIC001	YFSS520-02
S001	YFES905-06
M130	YFAFV-3
M131	YFES002-74
M132	YFES901-18
M133	YFES002-76
M134	YFES017-06
M135	YFES014-39
M136	YFES014-3
M137	YFES110-11
M138	YFES113-03
M140	YFES519-02
M141	YFES905-05
M142	YF146726
M143	YF146720
M144	YW328231
M186	YFES113-04
M187	YFES113-05


AUTO FOCUS LENS UNIT
M001
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M079
V001
L001
CN102
CN103
CN104
CN105
CN110
CN111
PCB001
PCB002
PCB003
PCB004
PCB005
PCB006
PCB007
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M186
M187
MIC001
S001
PCB021
PCB022
PCB023
PCB024
CN002–PF
CN102–PM
CN103–PM
①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
⑪
⑫

○Numbers show Screws

No.	Screw	Description
①	YFSG000–20	Pan Head Machine Black Screw
②	YFSG000–59	Pan Head Machine Black Screw
③	YFSG022–56	Pan Head Machine Black Screw
④	YFSG000–60	Pan Head Machine Black Screw
⑤	YFSG000–32	Pan Head Machine Black Screw
⑥	YFSG000–56	Pan Head Machine Black Screw
⑦	YFSG023–31	Pan Head Tapping Black Screw
⑧	YFSG000–51	Pan Head Tapping Black Screw
⑨	YFSG022–24	Pan Head Tapping Screw

M050	YFV5RA0007A4
M051	YFV6JA0005A4
M052	YFV5VA0006A3
M053	YFV7SB0029A4
M055	YFV2HA0026B4
M056	YFV2HA0030A4
M057	YFV2HA0027A4
M059	YFV7SA0027A4

PCB001	YFVPKB0101EA
PCB002	YFVPKB1001EA
PCB003	YFVPKC1001EA
PCB004	YFVPKD1001EA
PCB005	YFVPKE1001EA
PCB006	YFVPKK1001EA
PCB007	YFVPKF1001EA
PCB008	YFVPKG1001EA
PCB009	YFVPKH1001EA
PCB010	YFVPKA0804JA
PCB011	YFVPKB0805JA
PCB012	YFVPKC0805JA
PCB013	YFVPKD0805JA
PCB014	YFVPKA0806EA
PCB018	YFVPKA0808JA
V001	H4100
L001	ELY18A205H
SW001	YFSSP643
CN105	YFSB46001
CN107,108	YFHSJ88211
CN110	EMCU10B5T10A
M001	YFV5EA0070A3
M002	YFV6AA0005A3
M003	YFV9AA0043AS
M004	YFV5MA0001A4
M005	YFV4JA0004B4
M006	YWFAC17XFM2
M008	YFV2HA0023C3
M009	YFV2KA0029B2
M012	YFV2HA0020C3
M013	YFV2PA0021A4
M014	YFV3CA0003A4
M017	YFV4DA0002A4
M018	YFV9AA0047AN
M019	YFV9AA0048AN
M020	YFV9AA0044AN
M021	YFV2HA0025E4
M022	YFV2HA0031B4
M023	YFV2HA0040A4
M024	YFV5RA0005A4
M025	YFV5RA0006A4
M026	YFV5EC0018A3
M027	YFV5EB0026AS
M028	YFV2HA0021A4
M029	YFV2HA0022C4
M030	YFV2SA0015C4
M031	YFV9AA0045AS
M032	YFV2HA0028D3
M033	YWCC500LB13
M034	YWCC701FR01A
M036	YFV7SA0059A4
M037	YFFA-0002
M038	YFVAKA0030AN
M039	YFV1EA0003AS
M040	YFCCFILTER
M041	YFWBFILTER
M042	YFV7QA0130A4
M044	YVZC700RB50
M045	YFV5EA0019AS
M046	YFV5WA0042A4
M047	YFV5EC0021AS
M048	YFV2SA0017A4
M049	YFV5RA0003A4

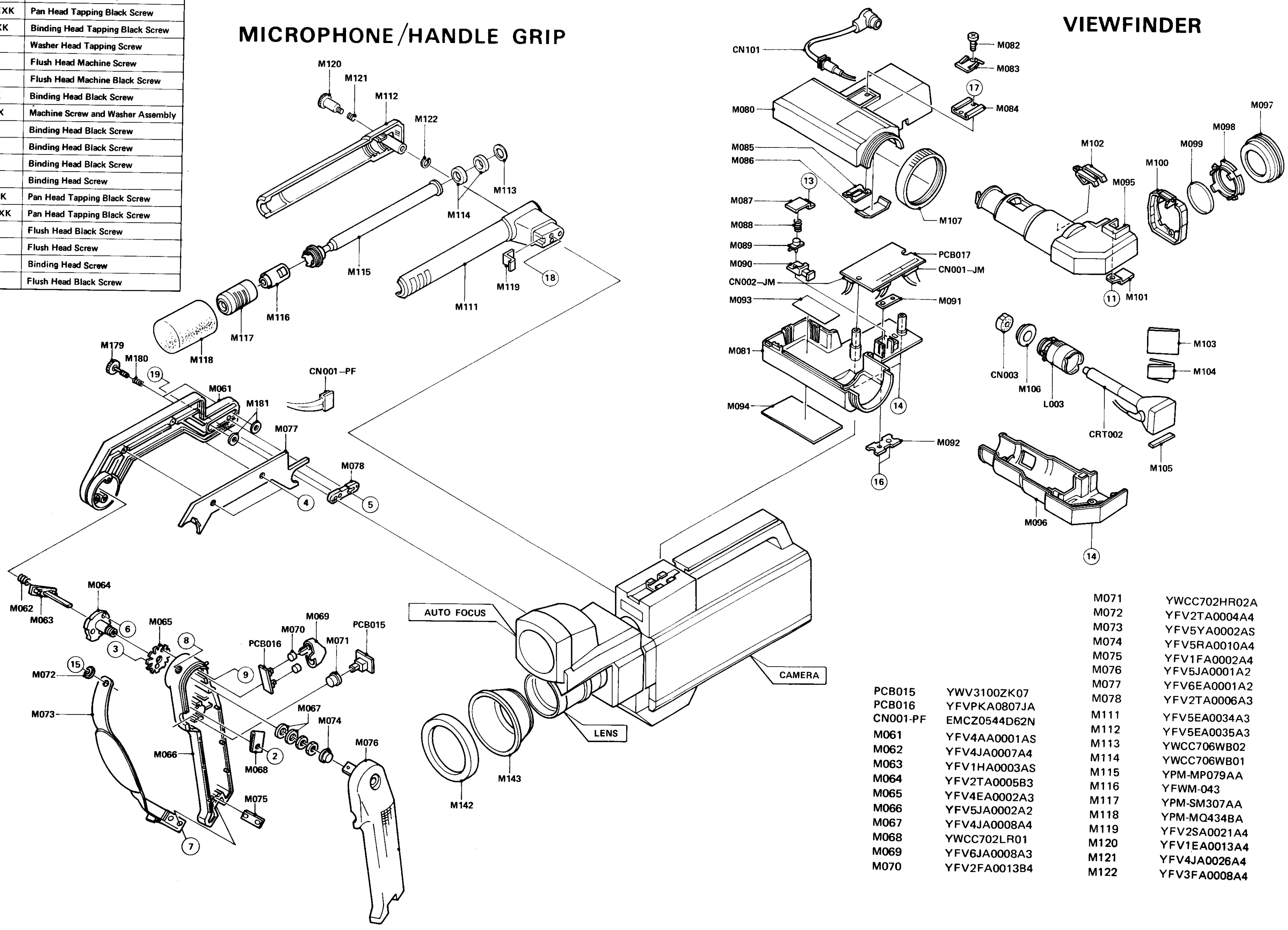
EXPLODED VIEW

○Numbers show Screws

No.	Screw	Description
①	XTB3+6BFXK	Binding Head Tapping Black Screw
②	XTB26+5BFX	Binding Head Tapping Screw
③	XTN26+15BEXK	Pan Head Tapping Black Screw
④	XTB26+8BFXK	Binding Head Tapping Black Screw
⑤	XTW3+8EFX	Washer Head Tapping Screw
⑥	XSS3+8FX	Flush Head Machine Screw
⑦	XSS26+6FXK	Flush Head Machine Black Screw
⑧	XSB26+6FXK	Binding Head Black Screw
⑨	XYN3+AC8FX	Machine Screw and Washer Assembly
⑩	XSB4+20FXK	Binding Head Black Screw
⑪	XSB3+4FXK	Binding Head Black Screw
⑫	XSB2+8FXK	Binding Head Black Screw
⑬	XTB3+8FX	Binding Head Screw
⑭	XTN3+30BFXK	Pan Head Tapping Black Screw
⑮	XTN26+10BFXK	Pan Head Tapping Black Screw
⑯	XSS3+8FXK	Flush Head Black Screw
⑰	XSS2+6FX	Flush Head Screw
⑱	XSB26+5FX	Binding Head Screw
⑲	XSS26+8FX	Flush Head Black Screw

MICROPHONE/HANDLE GRIP

VIEWFINDER


M120
M121
M112
M122
M113
M114
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M116
M117
M118
M111
M119
⑱
M179
M180
⑲
M061
M181
M077
M078
④
⑤
CN001-PF
M062
M063
M064
⑥
③
M065
⑧
⑨
M069
M070
PCB016
M071
PCB015
⑮
M072
M073
M066
M067
M074
M068
②
M076
M075
⑦
AUTO FOCUS
CAMERA
LENS
M142
M143
CN101
M080
M085
M086
⑬
M087
M088
M089
M090
CN002-JM
M093
M081
M094
M107
PCB017
CN001-JM
M091
⑭
M092
⑯
M082
M083
⑰
M084
M102
M095
M100
M099
M098
M097
⑪
M101
CN003
M106
L003
CRT002
M103
M104
M105
M096
⑭

PCB017	YFVPKA0803JA
CRT002	40JB4
L003	ELY15V113C
CN003	YFVFSOCKET
CN001-JM	EMCS0850Z
CN002-JM	EMCS0450Z
CN101	YF10F8PB145C
M080	YFV5EA0030A2
M081	YFV5EA0031B2
M082	YWCC704FM02
M083	YWCC704WM07
M084	YFV5MA0002A4
M085	YFV2CA0011A4
M086	YFV4JA0009A4
M087	YFV2CA0010A4
M088	YFV4JA0006A4
M089	YFV1HA0002A4
M090	YFV5RA0009A4
M091	YFV2SA0020A4
M092	YFV2SA0018A4
M093	YFV7MA0027A4
M094	YFV7SA0048A4
M095	YFV5EA0032A2
M096	YFV5EA0033A2
M097	YFV5GA0004A4
M098	YFV3CA0007A4
M099	YFV1VA0002A4
M100	YFV3CA0006A3
M101	YFV4JA0010A4
M102	YFV2VA0005A4
M103	YFV1UA0002A4
M104	YFV4JA0005A4
M105	YFV2FA0007A4
M106	YFV2FA0014A4
M107	YFV3FA0003A4
M179	YFV1EA0015A4
M180	YFV4JA0027B4
M181	YFV3FA0009A4

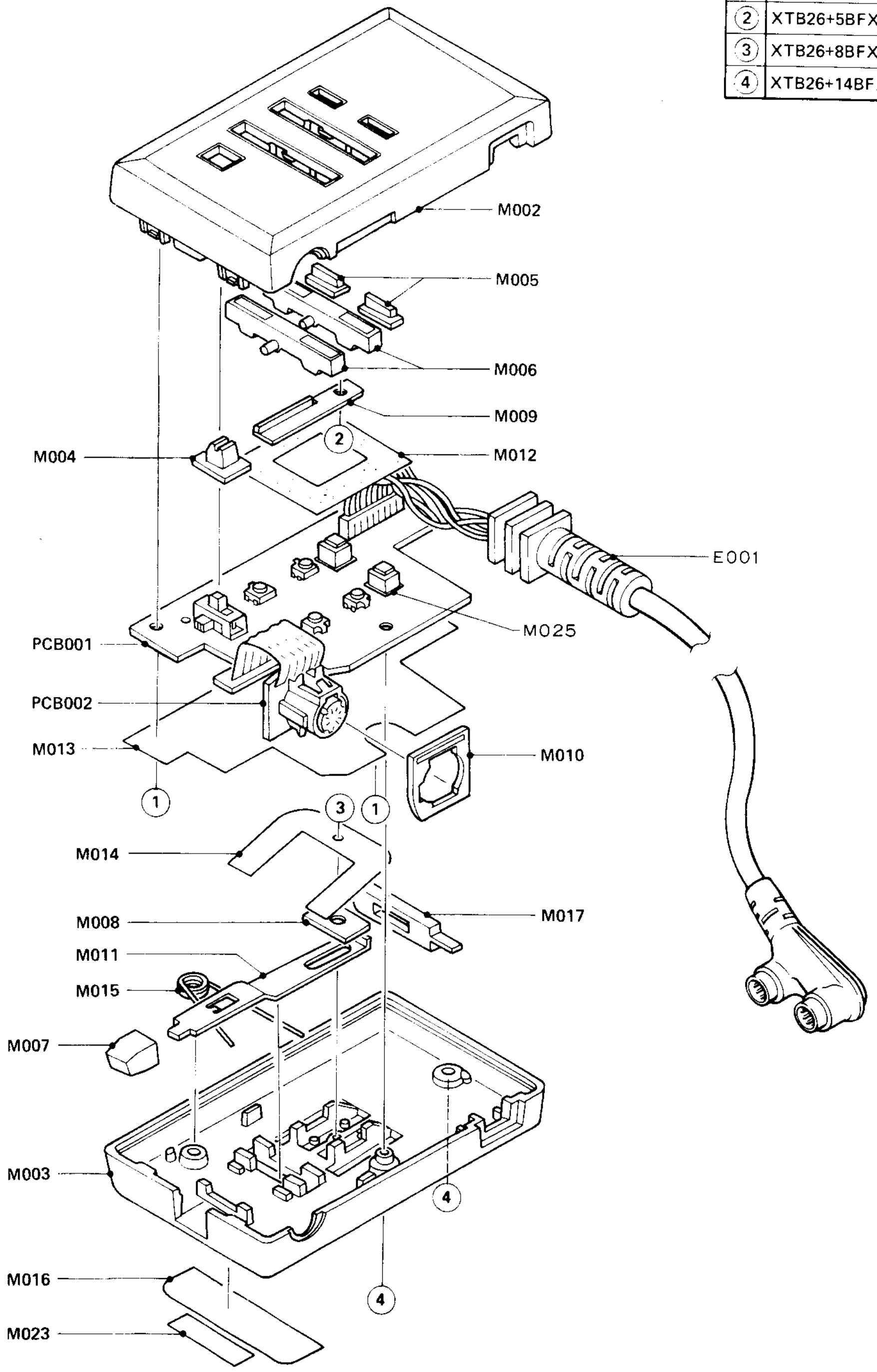
PCB015	YWV3100ZK07
PCB016	YFVPKA0807JA
CN001-PF	EMCZ0544D62N
M061	YFV4AA0001AS
M062	YFV4JA0007A4
M063	YFV1HA0003AS
M064	YFV2TA0005B3
M065	YFV4EA0002A3
M066	YFV5JA0002A2
M067	YFV4JA0008A4
M068	YWCC702LR01
M069	YFV6JA0008A3
M070	YFV2FA0013B4

M071	YWCC702HR02A
M072	YFV2TA0004A4
M073	YFV5YA0002AS
M074	YFV5RA0010A4
M075	YFV1FA0002A4
M076	YFV5JA0001A2
M077	YFV6EA0001A2
M078	YFV2TA0006A3
M111	YFV5EA0034A3
M112	YFV5EA0035A3
M113	YWCC706WB02
M114	YWCC706WB01
M115	YPM-MP079AA
M116	YFWM-043
M117	YPM-SM307AA
M118	YPM-MQ434BA
M119	YFV2SA0021A4
M120	YFV1EA0013A4
M121	YFV4JA0026A4
M122	YFV3FA0008A4

EXPLODED VIEW OF CAMERA REMOTED CONTROL

○ Numbers show screws

NO.	PART NUMBER	DESCRIPTION
①	XTB26+8BFX	Binding Head Tapping Screws
②	XTB26+5BFX	Binding Head Tapping Screws
③	XTB26+8BFXK	Binding Head Tapping Screws (Black)
④	XTB26+14BFXK	Binding Head Tapping Screws (Black)

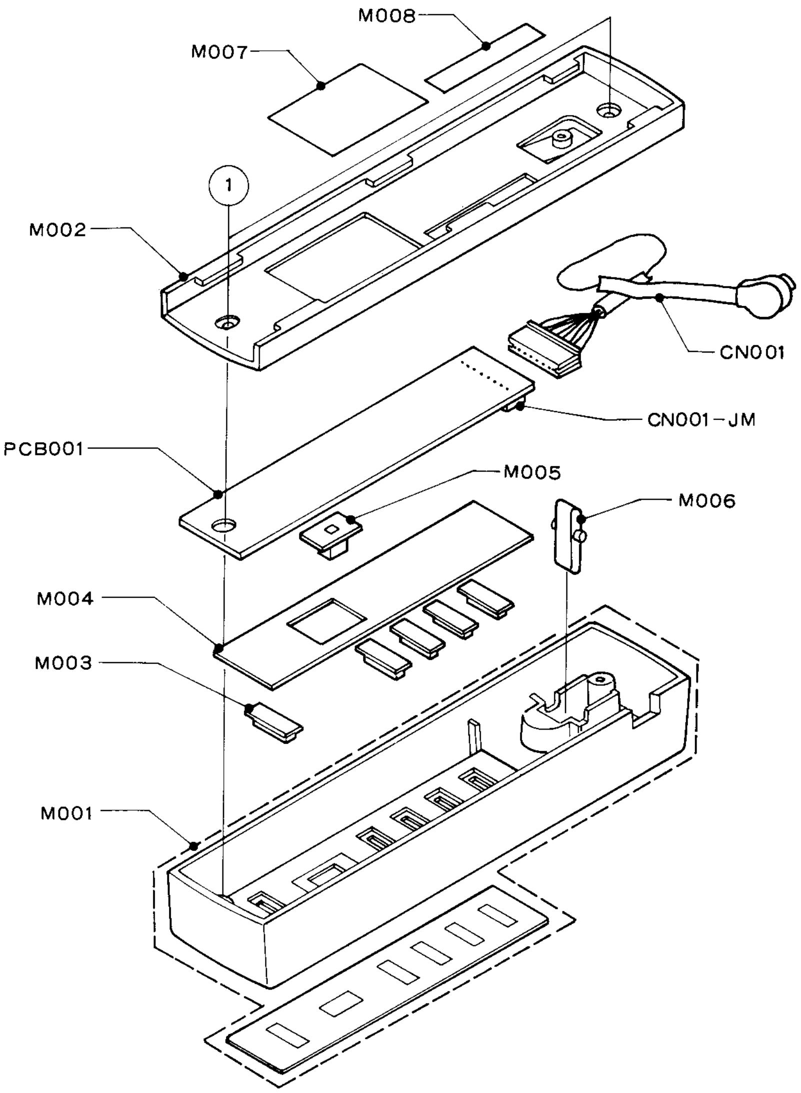

M002
M005
M006
M009
M004
M012
②
E001
M025
PCB001
PCB002
M013
M010
①
③
①
M014
M008
M017
M011
M015
M007
M003
④
M016
④
M023

PCB001	YFVPKB0101JA
PCB002	YFVPKB0101J2
E001	YFRCABLE90
M002	YFV5WA0080AS
	YFV5WA0070AS
M003	YFV5EA0054A2
M004	YFV5RA0011A4
M005	YFV6JA0006A4
M006	YFV6JA0011A4
M007	YFV6JA0012A4
M008	YFV2CA0012A4
M009	YFV2CA0018A4
M010	YFV2SA0024A4
M011	YFV4RA0002A4
M012	YFV2FA0021B4
M013	YFV2PA0018B4
M014	YFV4JA0015A4
M015	YFV4JA0016A4
M016	YFV7QA0153A4
	YFV7QA0137A4
M018	YFV4DA0003A4
M023	YVZC700RB50
	YWV240PUB01D

EXPLODED VIEW OF VTR REMOTED CONTROL

○ Numbers Show Screws

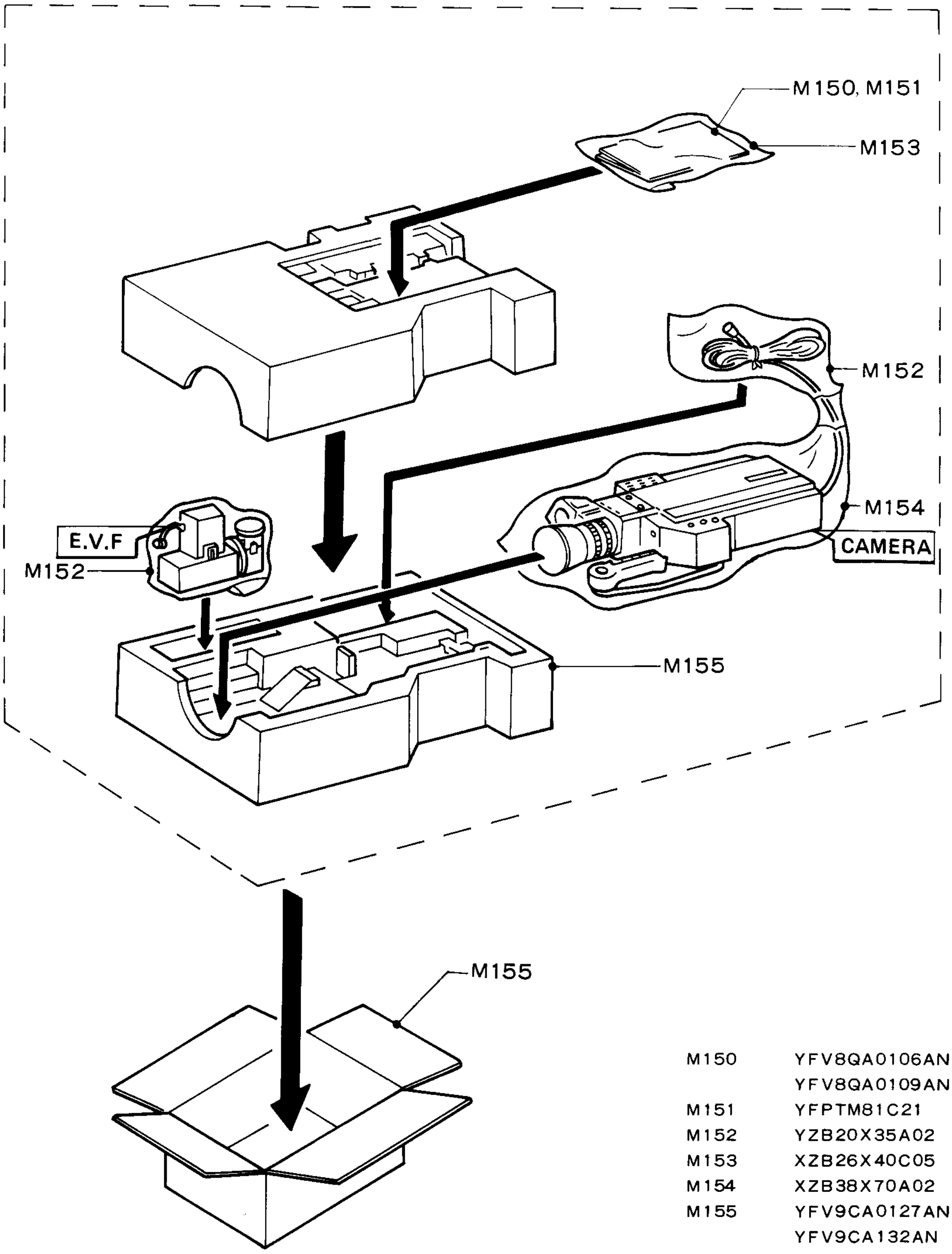
No.	SCREW	DESCRIPTION
①	XTB26+10BFXK	Binding Head Tapping Black screw



M008
M007
1
M002
CN001
CN001-JM
PCB001
M005
M006
M004
M003
M001

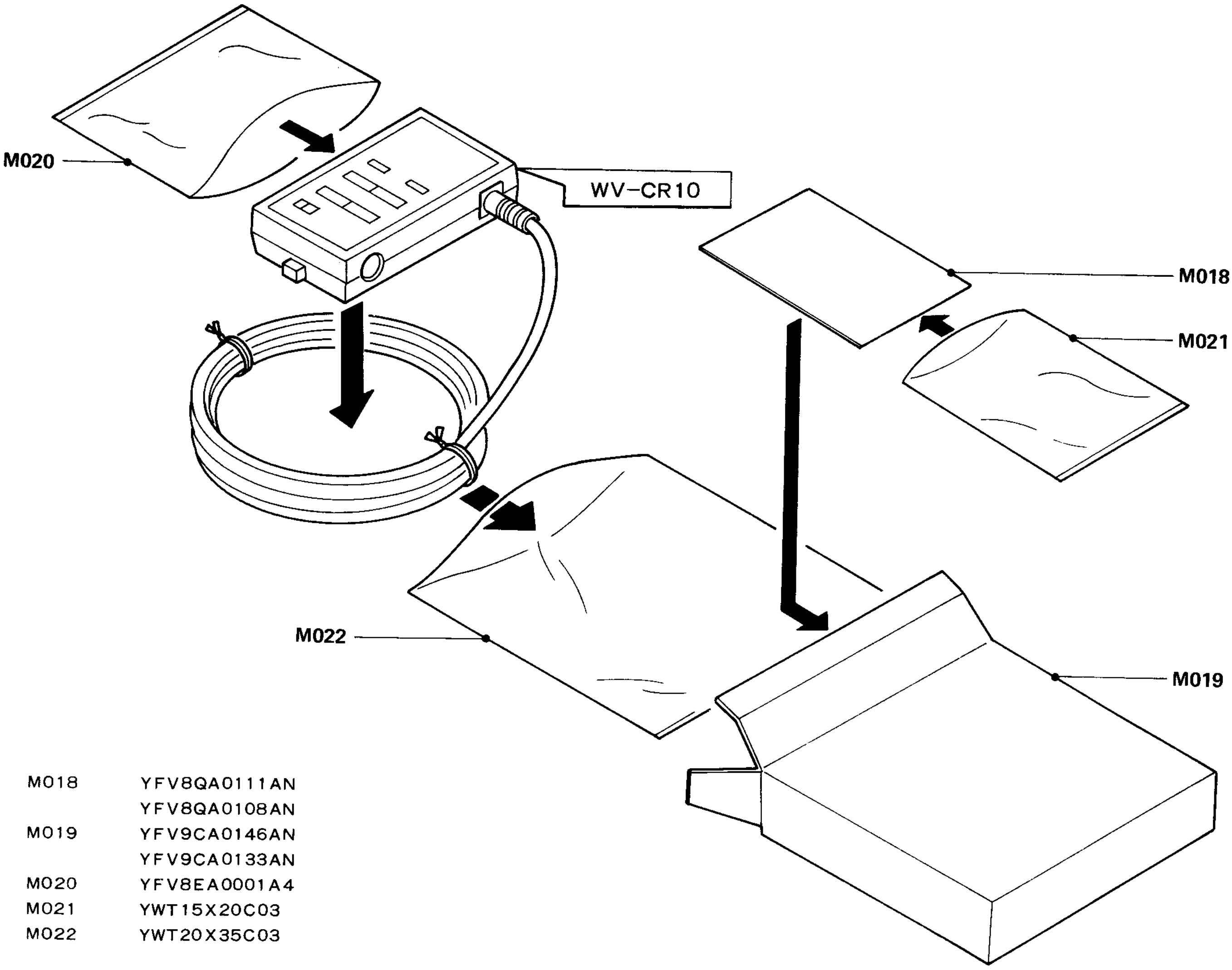
PCB001	YFVPKB0101EA
CN001	YFRP68PL180
M001	YFV5WB0041AS
M002	YFV5KA0018A3
M003	YFV6JA0006A4
M004	YFV2FA0029A4
M005	YFV5RA0008A4
M006	YFV5RA0018A4
M007	YFV7QA0154A4 YFV7QA0136A4
M008	YVZC700RB50

PACKAGING OF CAMERA


M150, M151
M153
M152
M154
CAMERA
E.V.F
M152
M155
M155

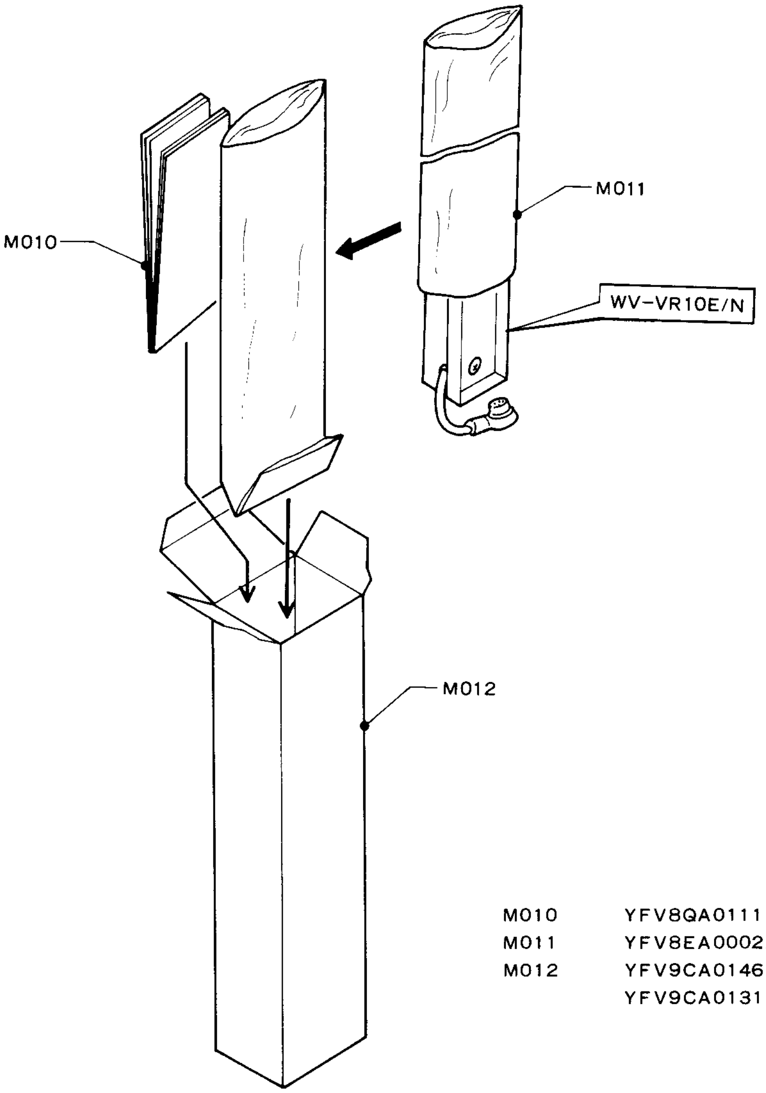
M150	YFV8QA0106AN YFV8QA0109AN
M151	YFPTM81C21
M152	YZB20X35A02
M153	XZB26X40C05
M154	XZB38X70A02
M155	YFV9CA0127AN YFV9CA132AN

PACKAGING OF CAMERA REMOTED CONTROL


M020
WV-CR10
M018
M021
M022
M019

M018	YFV8QA0111AN
	YFV8QA0108AN
M019	YFV9CA0146AN
	YFV9CA0133AN
M020	YFV8EA0001A4
M021	YWT15X20C03
M022	YWT20X35C03

PACKAGING OF VTR REMOTED CONTROL


M011
M010
WV-VR10E/N
M012

M010	YFV8QA0111AN
M011	YFV8EA0002AN
M012	YFV9CA0146AN
	YFV9CA0131AN